Omurgalı hayvanların karşılaştırmalı Anatomisi

Neden ?

1. Homoloji

- Kedi ön ekstremitesi
- Kuşkanadı
- İnsan kolu
- Yunus yüzgeçleri
- At toynakları
- Yarasa kanatları

2.Embriyonal Gelişme

- Tüm omurgalılarda yutak keseleri ve yarıklarının varlığı
- Yutak kese ve yarıklarının yüksek omurgalılarda oluşum ve kapanış nedenleri

3. Aorta yaylarının benzerliği

- Başlangıçta tüm gruplarda benzerlik sonra kuş ve memelilerde farklılık

Rekapütülasyon teorisi = Biogenesis kanunu

Birey gelişimi esnasında atasının belirli safhalarından geçer – yüksek formların embriyosu aşağı formların erginlerine benzer

Ontogeni (bireyin yaşam öyküsü), Filogeni (Kök tarihi) yi özetler (Rekapütüle eder)

Sonuç :

- **Anatomi homolojileri anlama,**
- **Filogenetik akrabalıkları açığa çıkarma**
- **Ata form yapı ve görünümü hakkında bilgi edinme**
- **Hareket ve düşünce tarzını anlama**

Kordalıların Ortak Temel Özellikleri

1. *Embriyoda notokordanın varlığı*
2. *Embriyoda, duvarlarında kese veya yarık içeren yutağın varlığı*
3. *Tüp şeklinde sinir sisteminin varlığı*

Chordata sınıflandırılması

Phylum : Chordata

Subphylum : Urochordata (Tunicata)

Subphylum : Cephalochordata

Subphylum : Vertebrata (Omurgalılar)

Chordata : Korda'lı hayvanlar

1. Subphylum : Urochordata

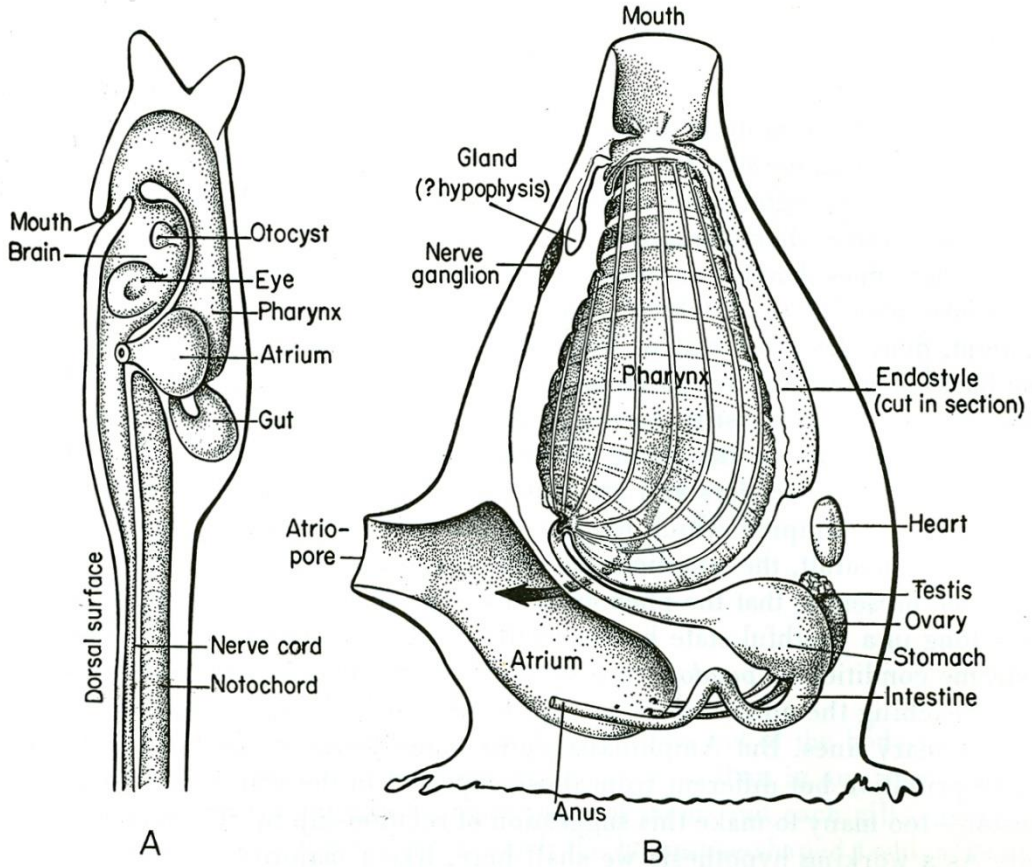


Fig. 6. A solitary tunicate. *A*, Diagram of the structures seen in the free-swimming larva (head end above, and only a short section of tail figured). The otocyst is a simple ear structure. *B*, The sessile adult, formed by elaboration of the structures at the anterior end of the larval body. The original dorsal side lies at the left: The large pharynx is attached to the body wall above and below (left and right in the figure); the atrium (corresponding to the peribranchial space of Amphioxus) bounds it on either side. Water passing through the latticework gills of the pharynx enters the atrium and, as indicated by the arrow, streams out through the atriopore. (After Delage and Hérouard.)

Tunicata larvası

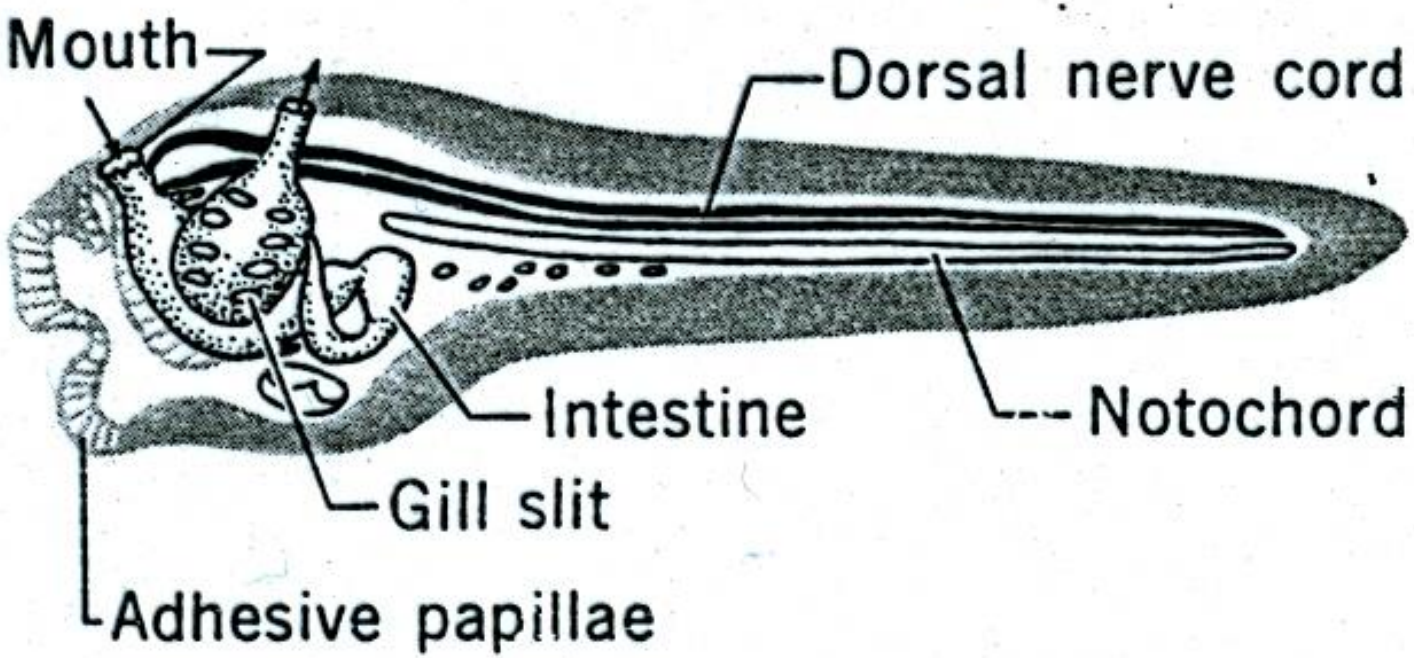
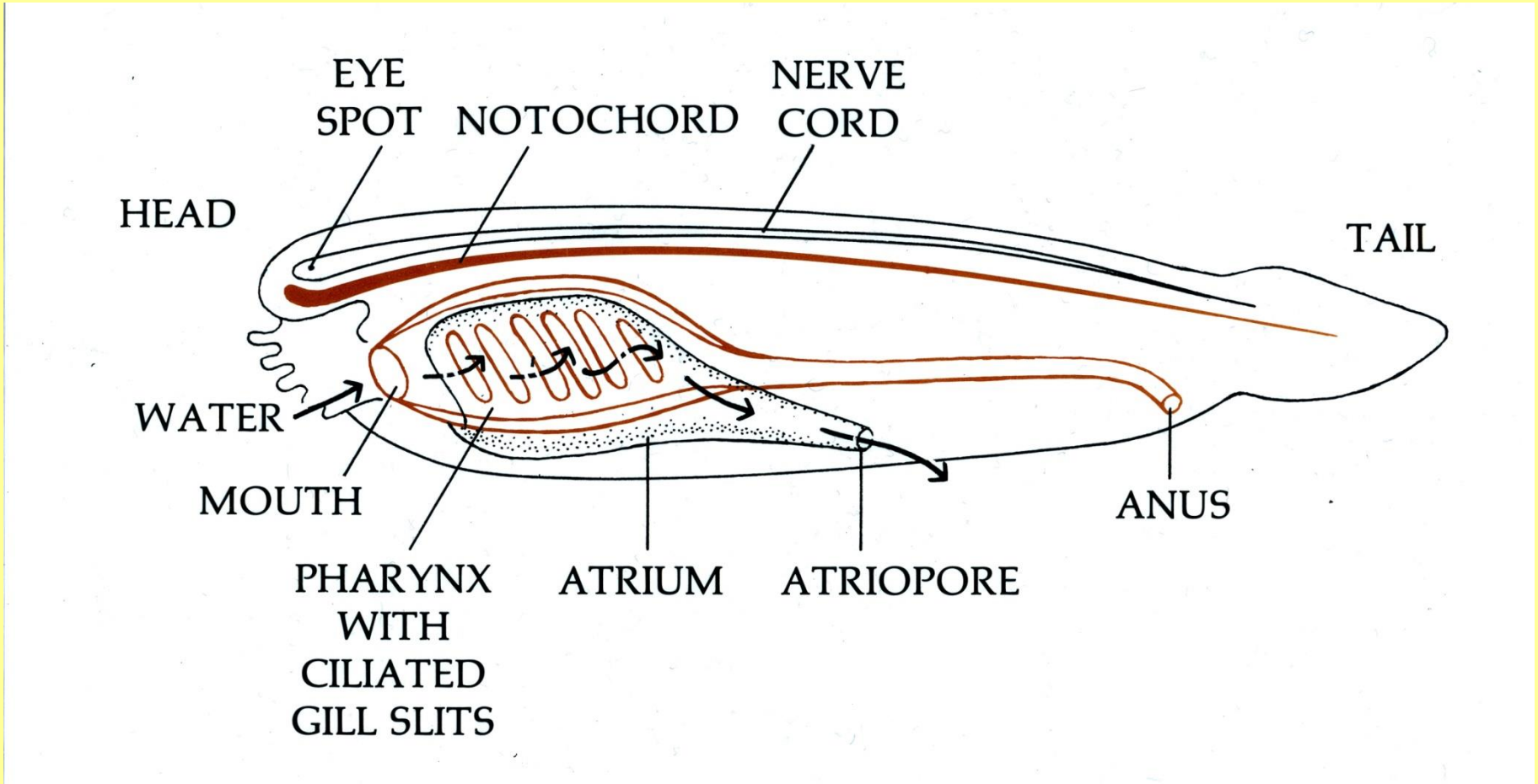


Figure 22-8. The free-swimming larva of a tunicate, showing all three chordate characteristics: notochord, dorsal nerve cord, and gill slits.

2.Subphylum : Cephalochordata



3. Subphylum : Vertebrata

Omurgalıların Ortak Temel Özellikleri

1. *Embriyoda notokordanın varlığı*
2. *Embriyoda, duvarlarında kese veya yarık içeren yutağın varlığı*
3. *Tüp şeklinde sinir sisteminin varlığı*
4. *Omurganın gelişmesi*

3. Subphylum : Vertebrata

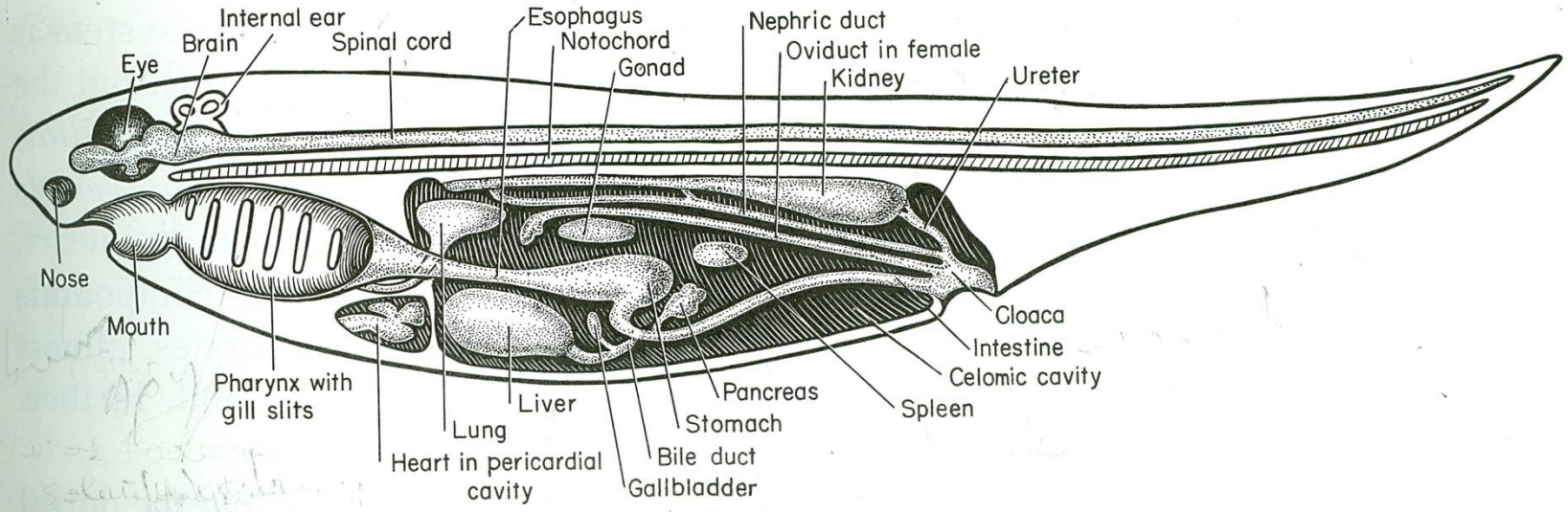
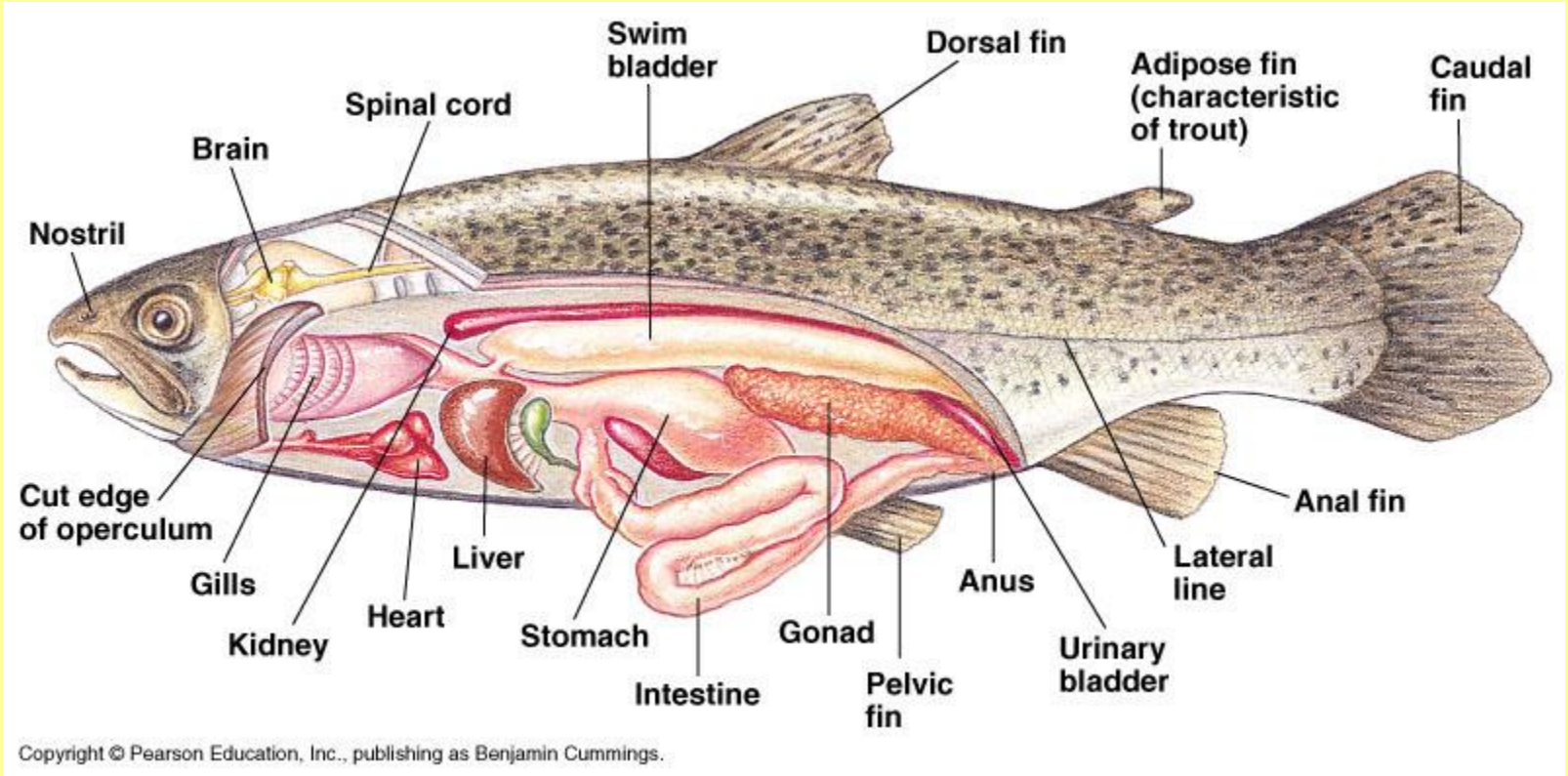


Fig. 1. Diagrammatic longitudinal section through an "idealized" vertebrate, to show the relative position of the major organs.



Omurgalıların vücut planı

A – Eksenler

Anteroposterior (Longitudinal eksen) **: Anterior veya baş ucundan posterior veya kuyruk ucuna kadar uzanan eksen.**

Dorsoventral eksen **: Dorsal (sırt) taraftan ventral (karın) tarafına uzanan eksen.**

Sol - sağ eksen **: Vücudun solundan sağına uzanan eksen.**

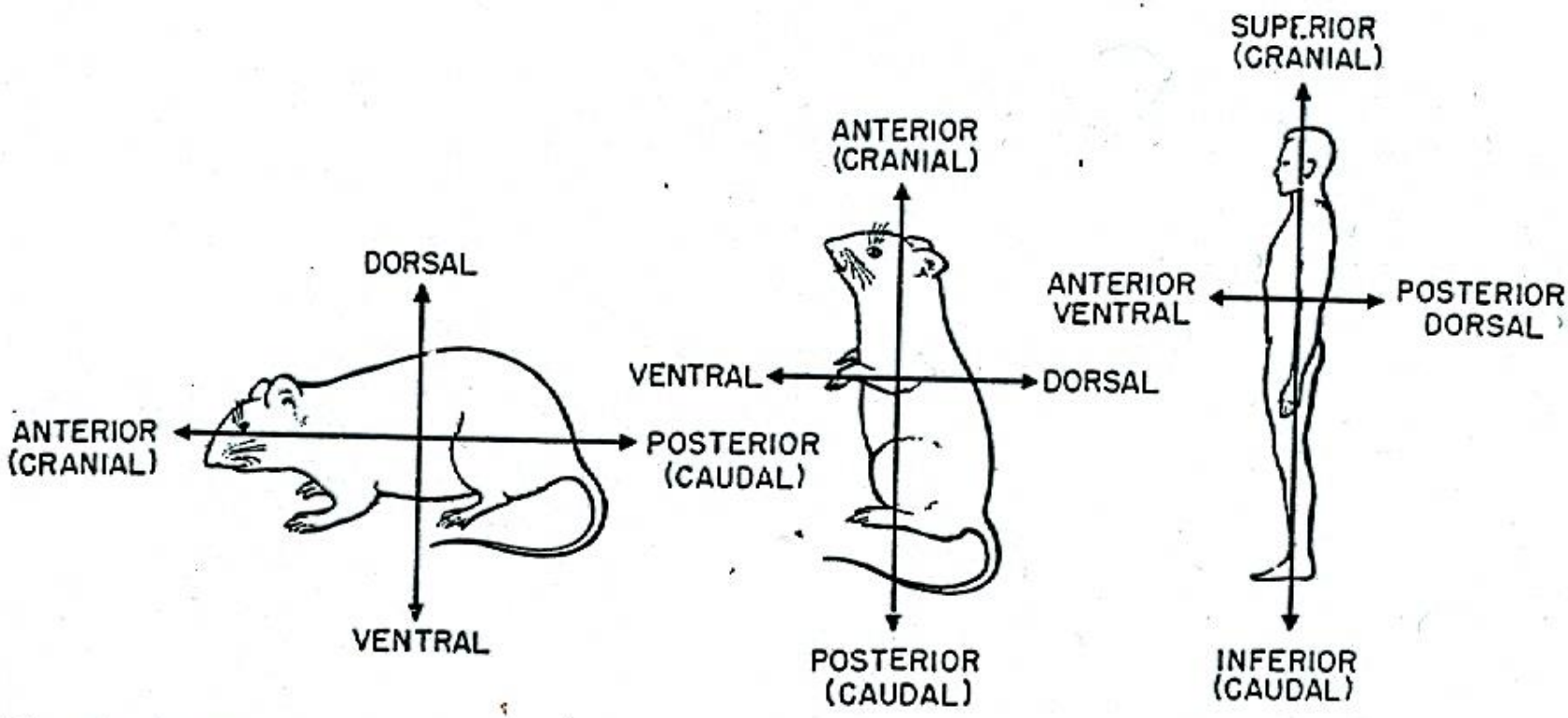
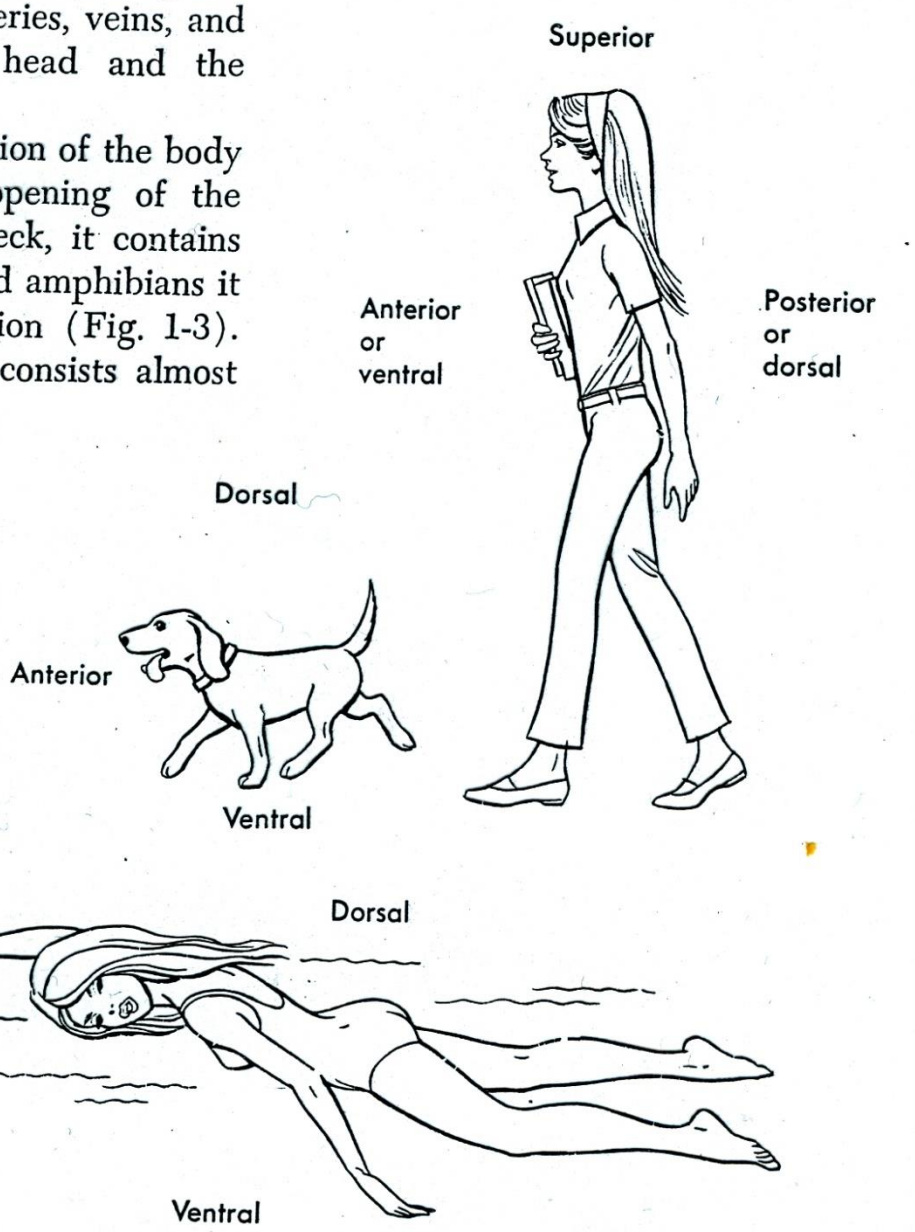


Fig. 3. Diagram to show the contrast in positional terms between normal vertebrates and man.

tubes (esophagus, long arteries, veins, and trachea) connecting the head and the trunk.

Tail. The tail is an extension of the body wall behind the caudal opening of the digestive tract. Like the neck, it contains no coelom. In fish and tailed amphibians it is used chiefly for locomotion (Fig. 1-3). The tail of all vertebrates consists almost



B - Düzlemler

Transvers düzlem **: Vücudu anteriör ve posteriör kısımlara bölen düzlem. “ transvers kesit ”**

Frontal düzlem **: Vücudu dorsal ve ventral kısımlara bölen düzlem. “ frontal kesit “**

Sagittal düzlem**: Vücudu sağ ve sol kısımlara bölen düzlem. “ sagittal kesit ”**

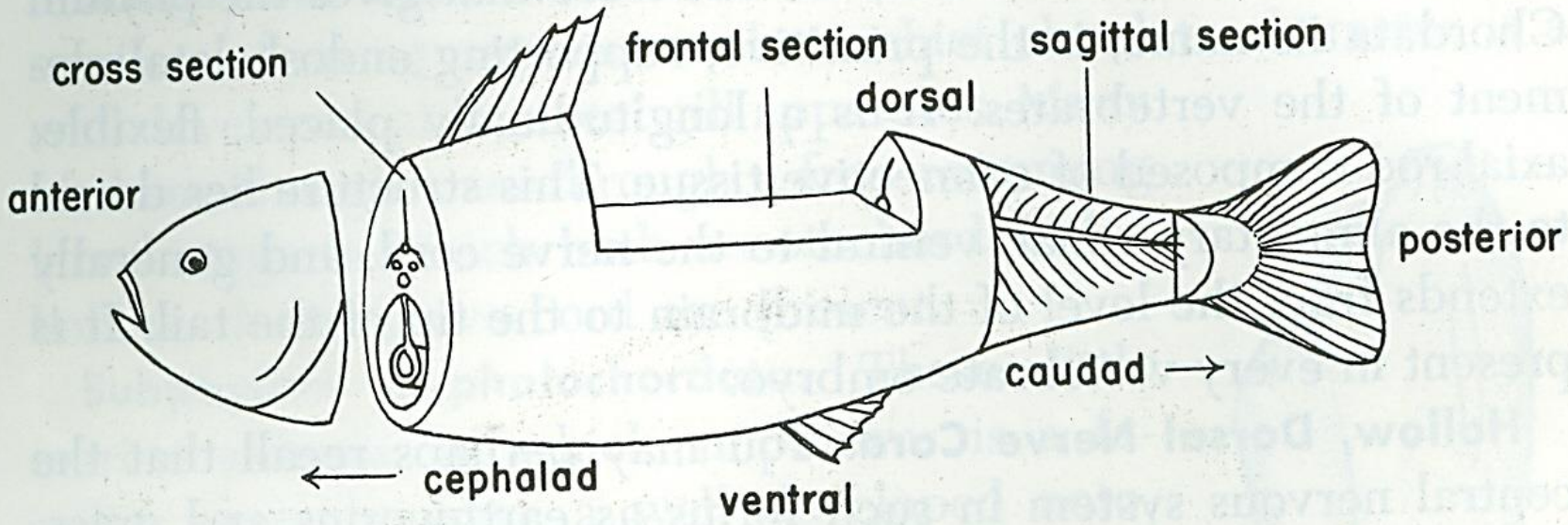


FIG. 1-4. Directions and planes in a vertebrate body.

Omurgalıların sınıflandırılması

Phylum : Chordata

Subphylum : Vertebrata

Superclassis **:** Pisces

Classis : **Agnatha**

Classis : **Placodermi**

Classis : **Chondrichthyes**

Classis : **Osteichthyes**

Superclassis : Tetrapoda

Classis : **Amphibia**

Classis : **Reptilia**

Classis : **Aves**

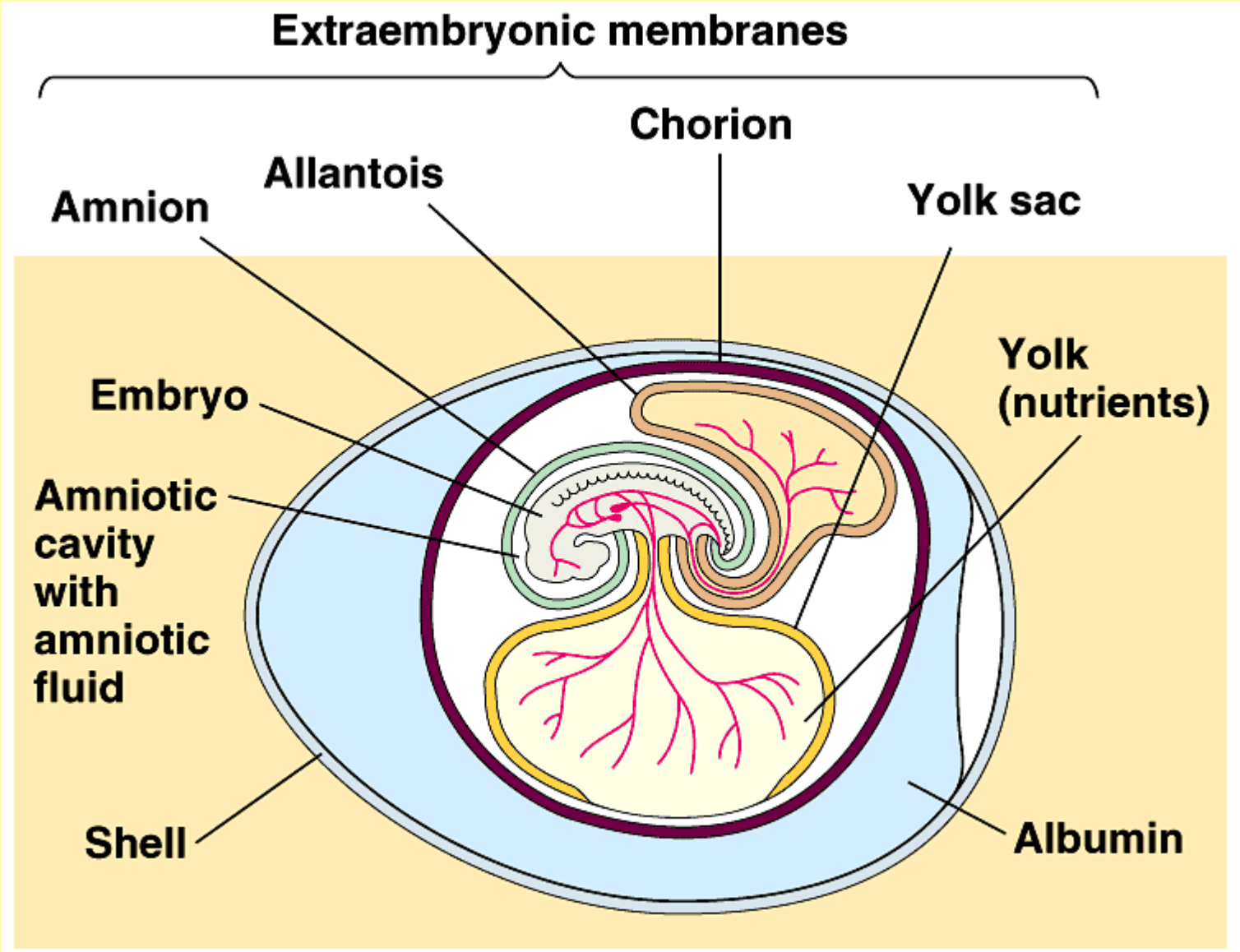
Classis : **Mammalia**

Omurgalı Tür sayıları

Omurgalı gruplar	Tür sayısı (aktüel)
Agnatha	50-55
Chondrichthyes	600-700
Osteichthyes	19000-21000
Amphibia	2500
Reptilia	6000
Aves	8600
Mammalia	4500

Omurgalı sınıflarının gruplandırılması

Omurgalı gruplar	Çene	ekstremite	Embr. zar	Isı düzeni
Agnatha	**Agnathostomata**	**Pisces**	**Anamniota**	**Ectothermal**
Chondrichthyes	**Gnathostomata**			
Osteichthyes				
Amphibia		**Tetrapoda**		
Reptilia			**Amniota**	
Aves				**Endothermal**
Mammalia				



Omurgalı Soy ağacı

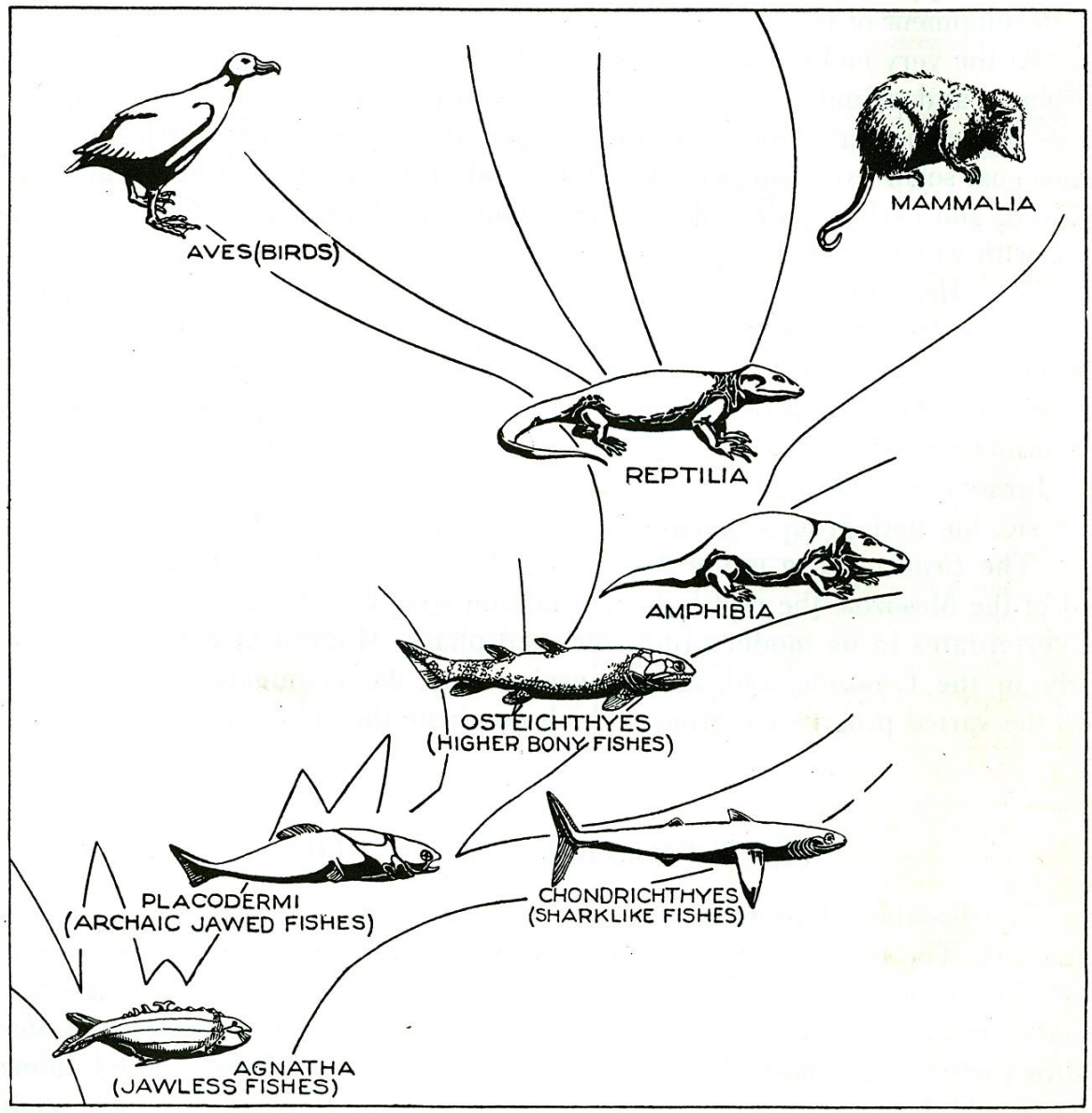
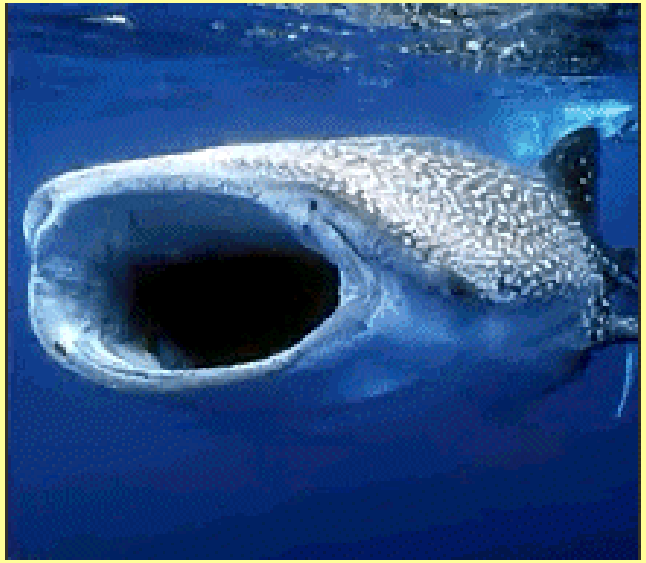
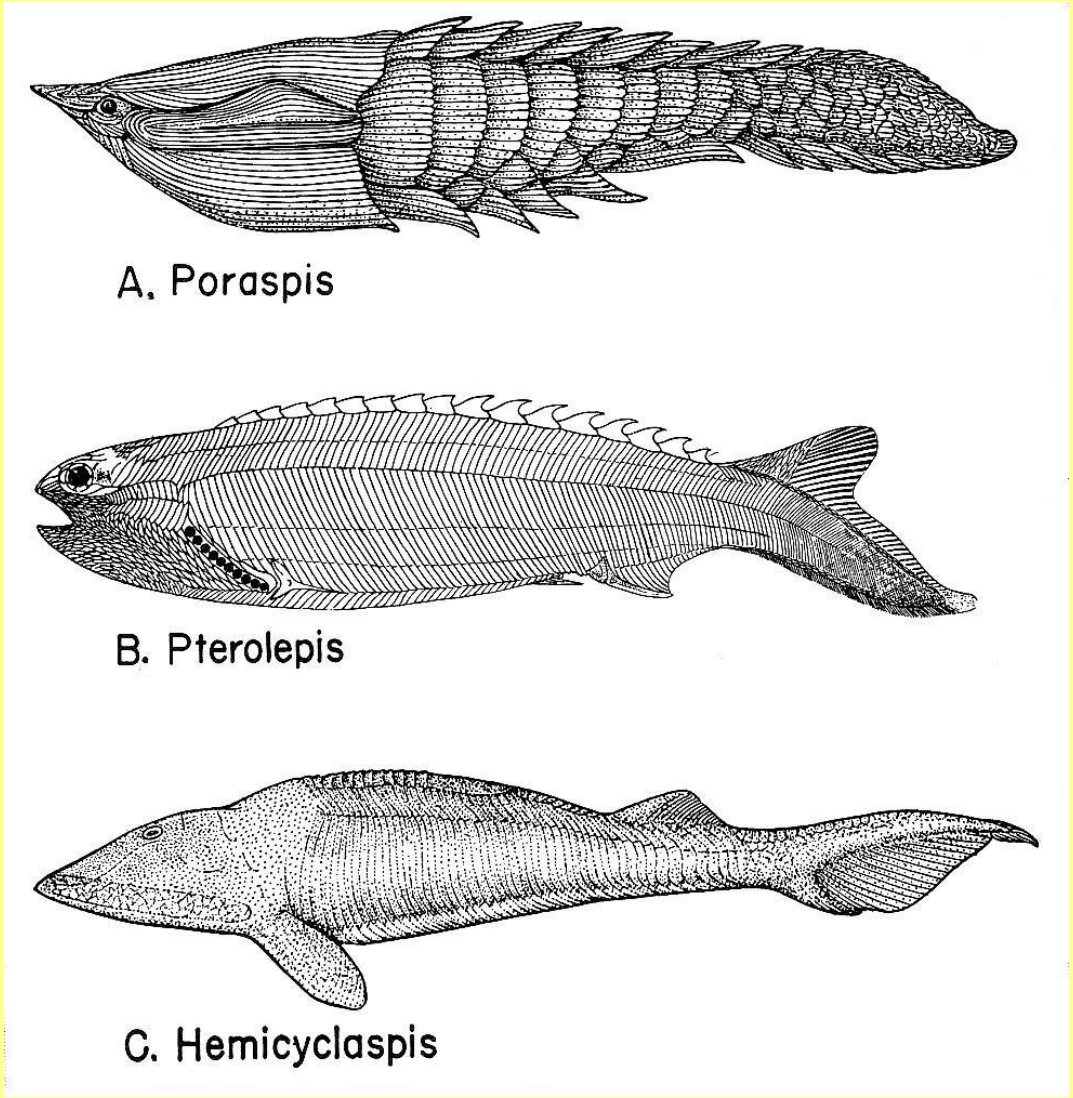


Fig. 15. A simplified family tree of the classes of vertebrates. (From Romer, The Vertebrate Story, University of Chicago Press.)

Classis: Agnatha

Subclassis: Ostracodermi



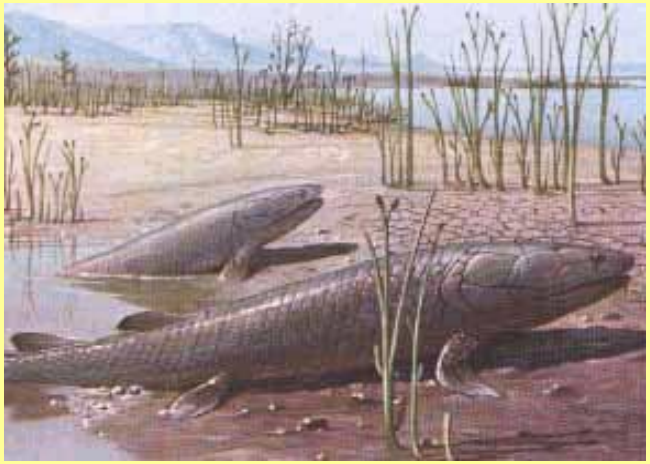


Subclassis : Cyclostomata

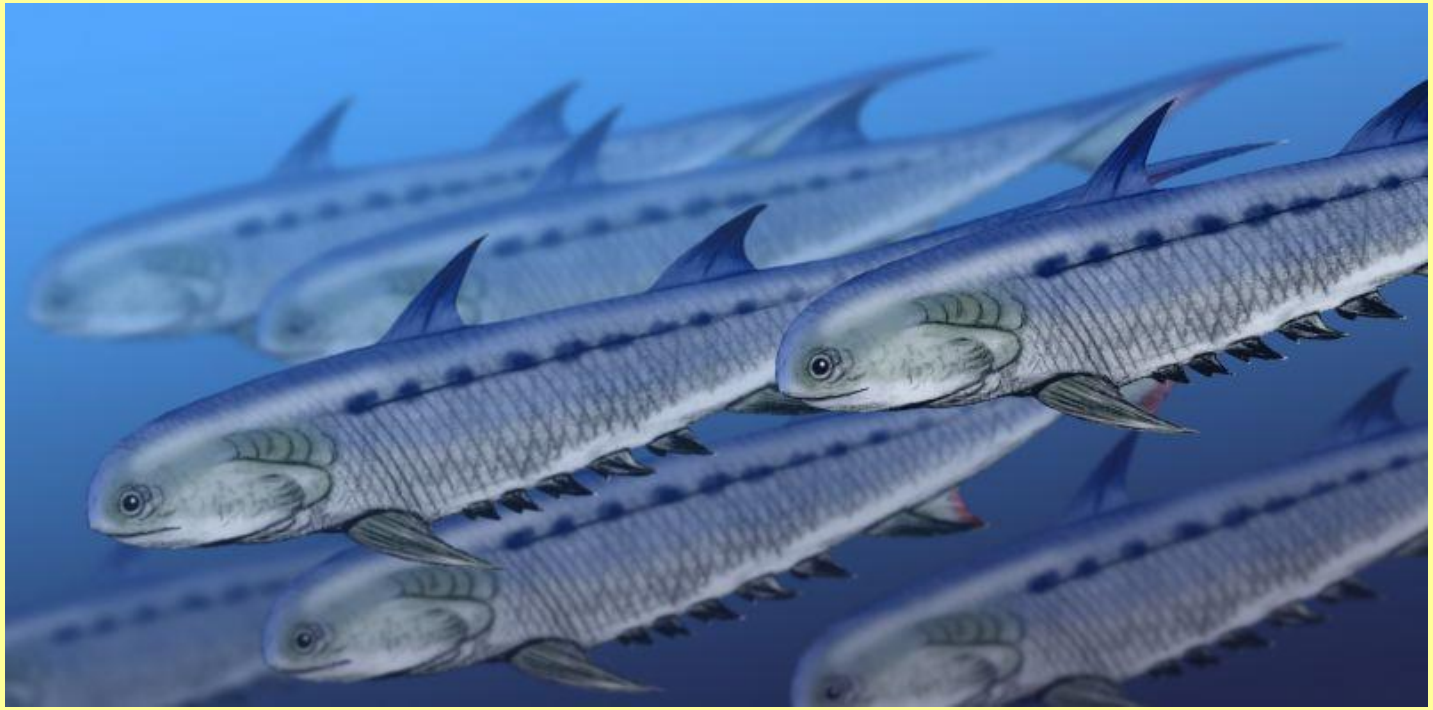
Ordo Myxinoidea

Ordo : Petromyzontia

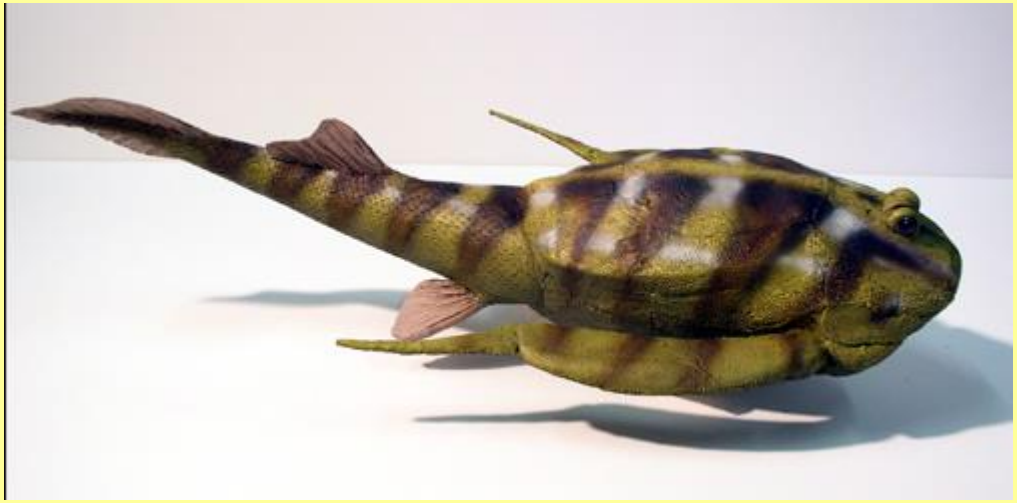
Classis : Placodermi



Climatius



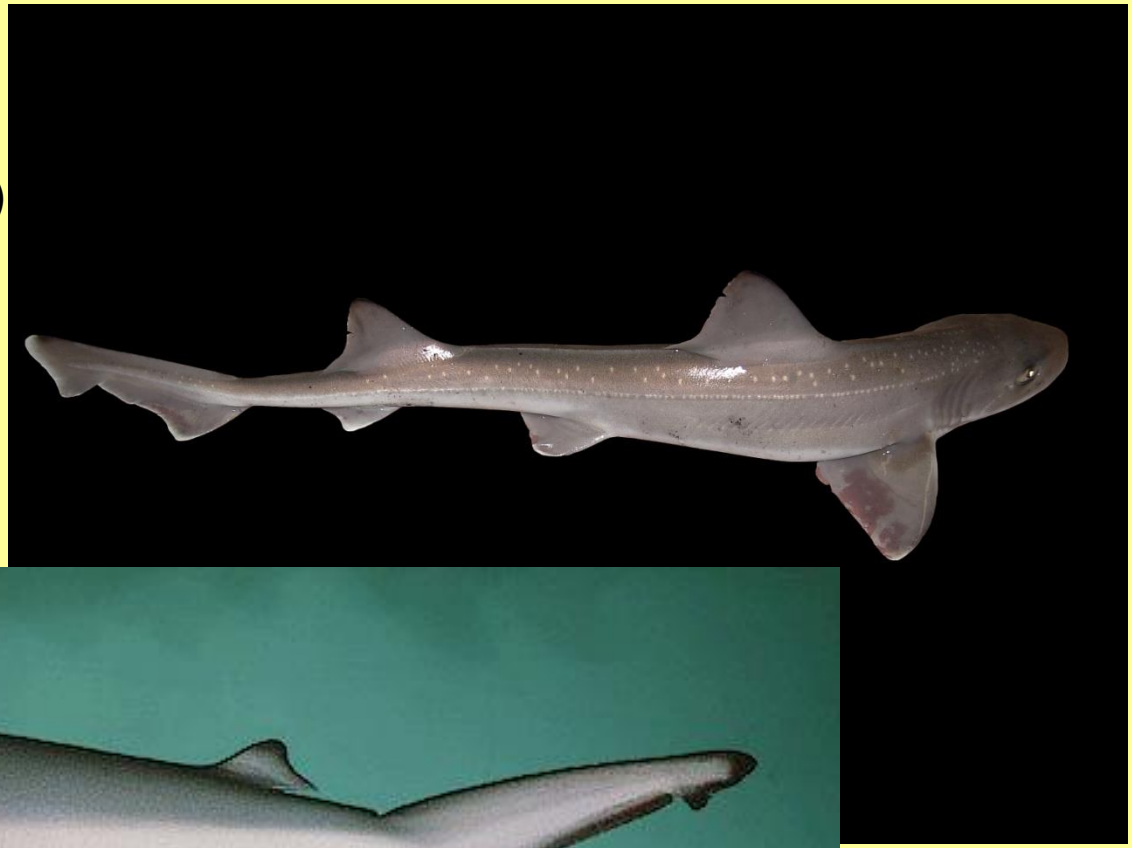
Bothriolepis

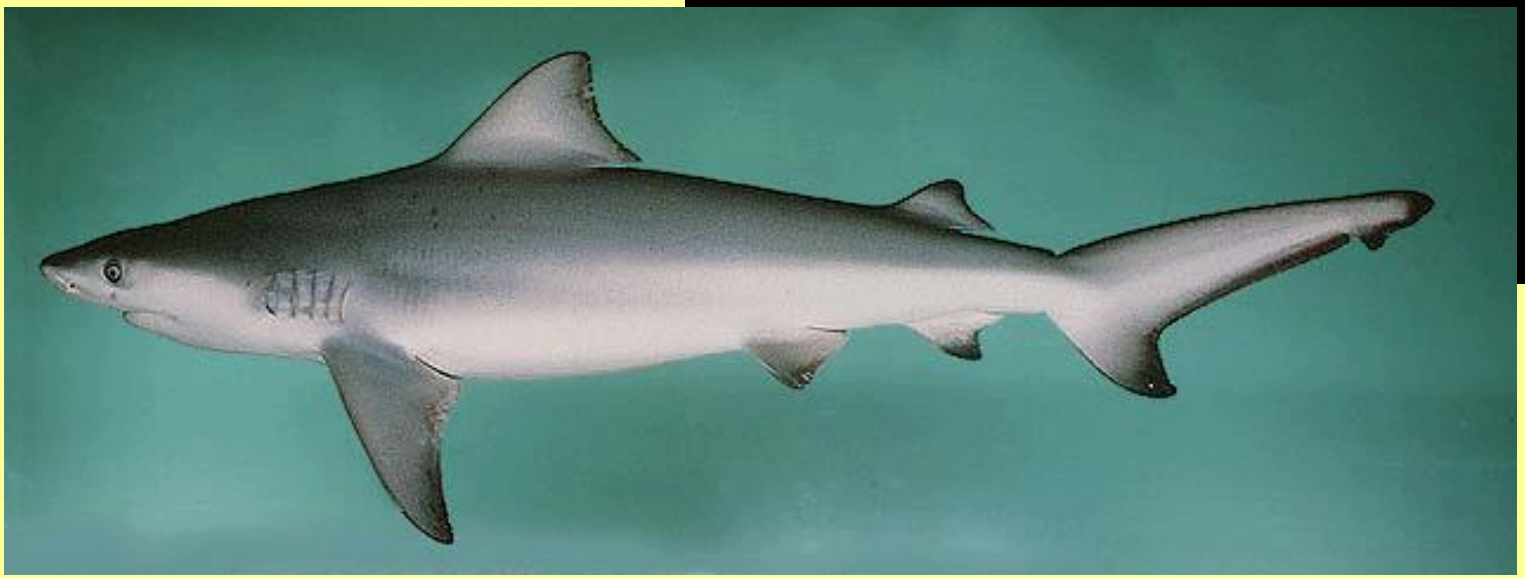


Classis: Chondrichthyes

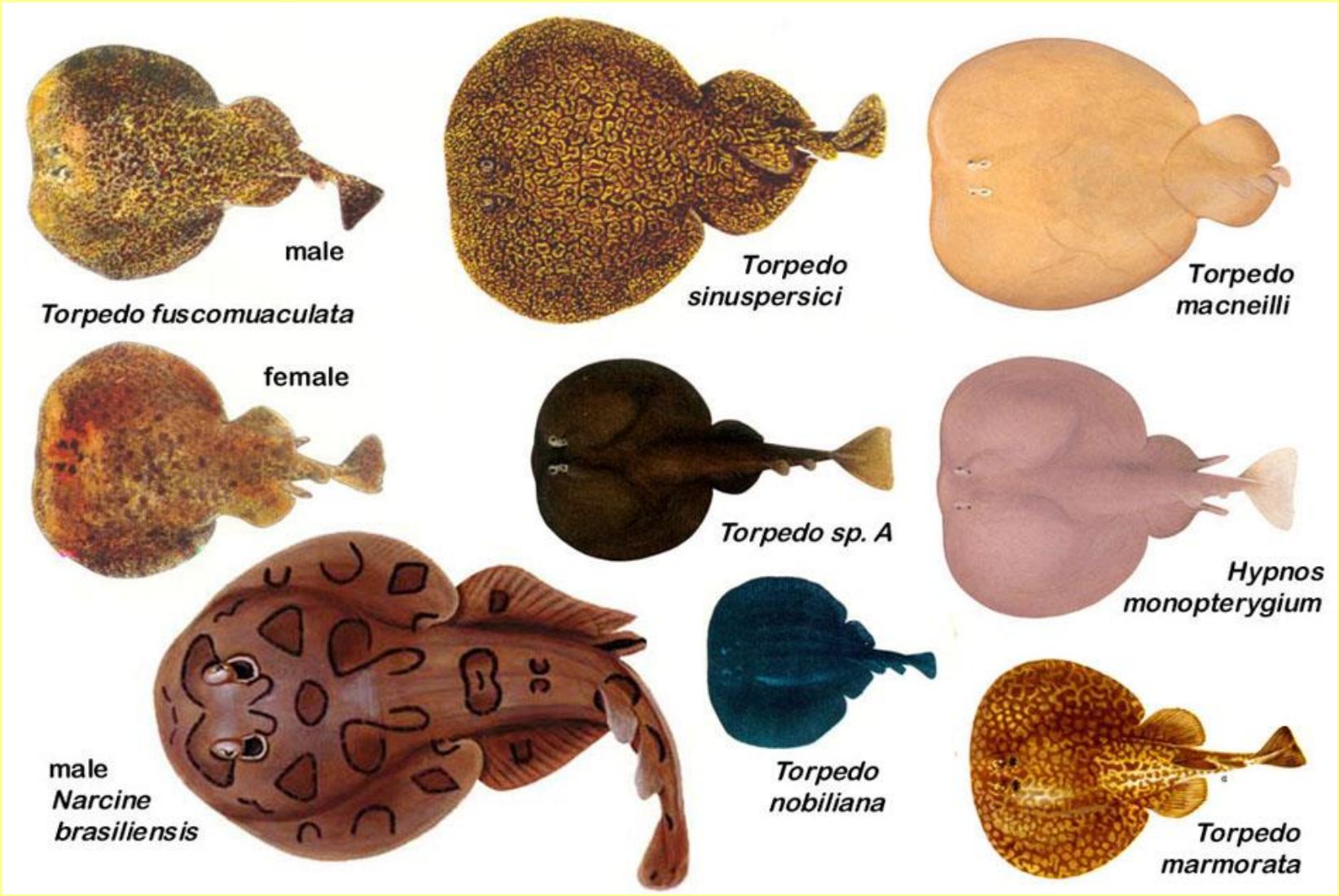
Subclassis : Elasmobranchii (Çıplak solungaç yarıklılar)

Ordo: Selachii (Köpek balıkları)

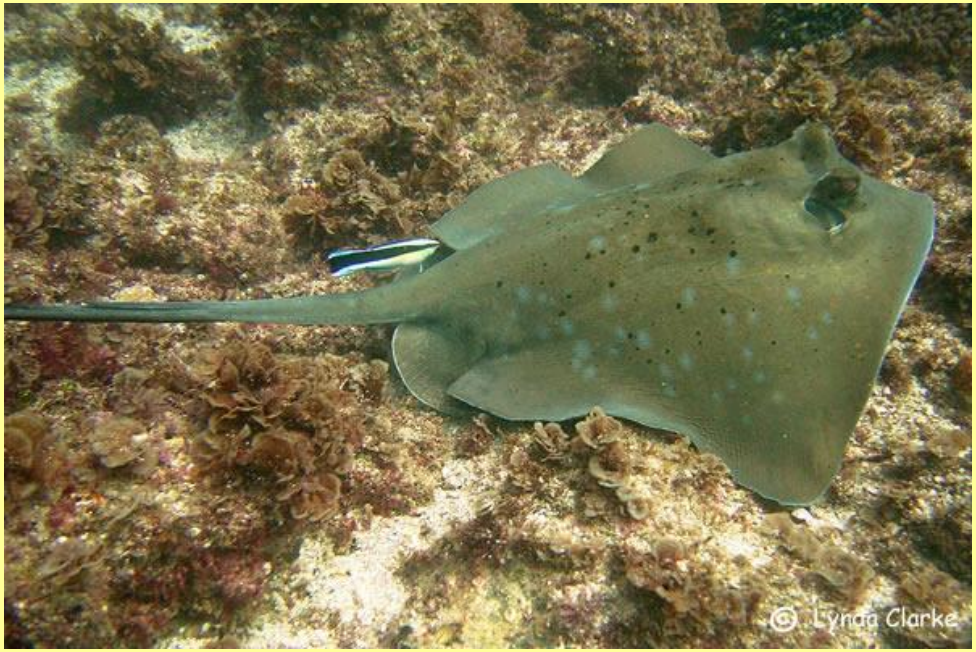




Subclassis : Elasmobranchii
Ordo : Batoidea



Ordo: Batoidea



Subclassis : Holocephali (Solungaç yarıkları etsi operküllü)

Chimaera

Classis: Osteichthyes

Subclassis : Sarcopterygii (Choanichthyes)

Loplu yüzgeçliler (İç burun delikli)

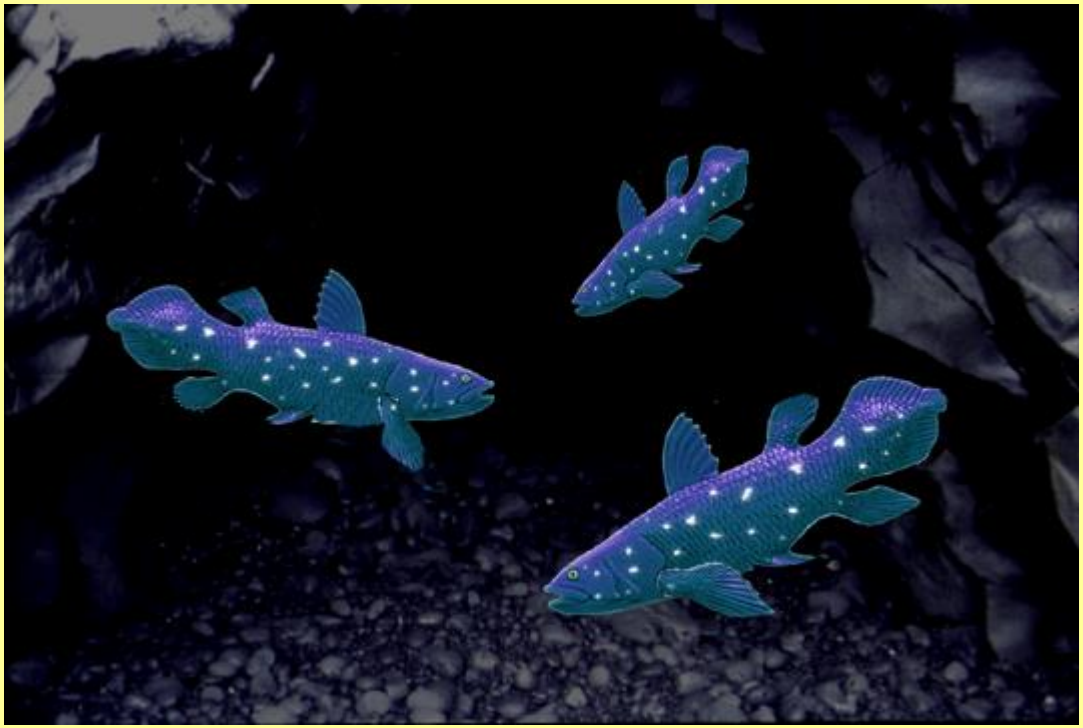
Ordo: Crossopterygii

(Amphibia atası)

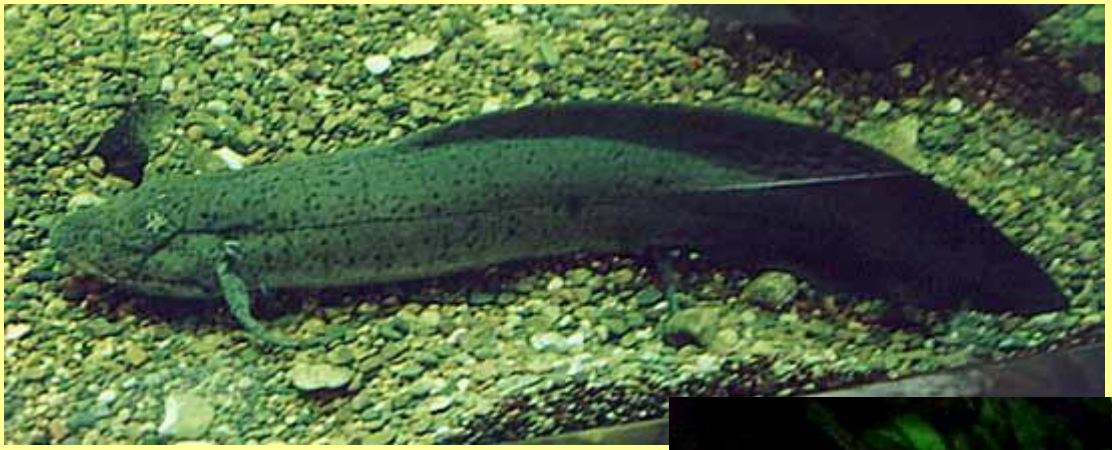
Eusthenepteron

Eusthenepteron

Latimeria
(iç burun deliksiz)



Ordo: Dipnoi (Akciğerli balıklar)



Lepidosiren

Protopterus

Subclassis : Actinopterygii -Işın yüzgeçliler

Superordo : Chondrostei (Kıkırdaklı gonoid'ler – paleozoik)

Polypterus

Acipencer

Superordo : Holostei (Kemikli ganoidler – Çoğu Mesozoik)

Lepidosteus

Amia

Superordo: Teleostei – Aktüel kemikli balıkların, %95'i

Perca fluviatilis
(Levrek)

Salmo turutta (Alabalık)

Scomber scombrus **(Uskumru)**

Sardina pilchardus **(Sardalya)**

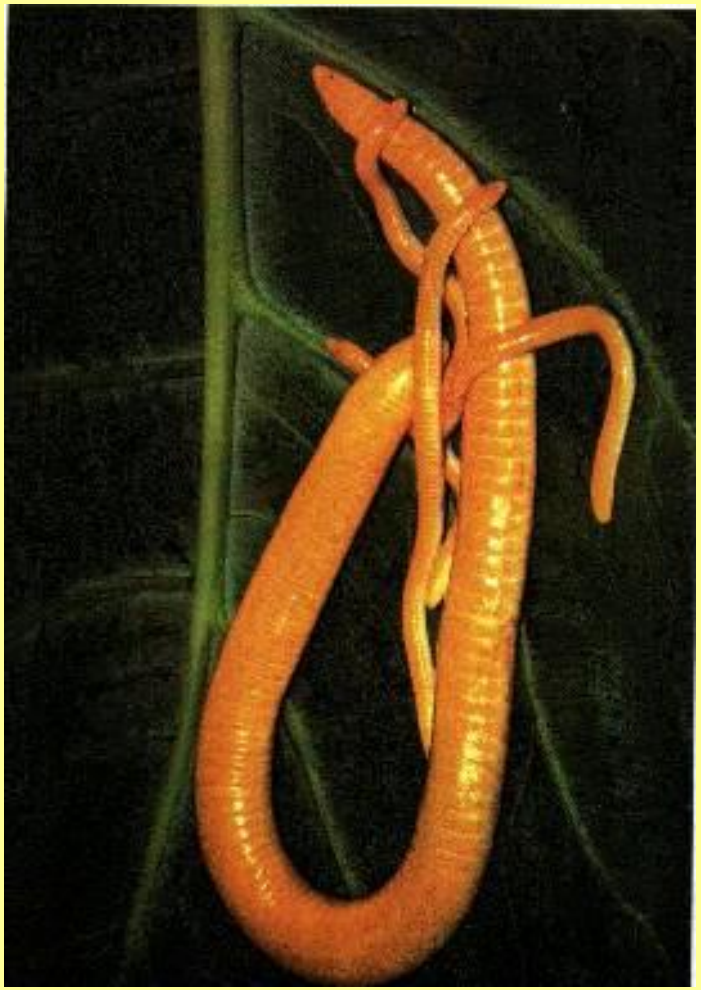
Sarda sarda **(Palamut)**

Mullus barbatus **(Barbunya)**

Classis : Amphibia

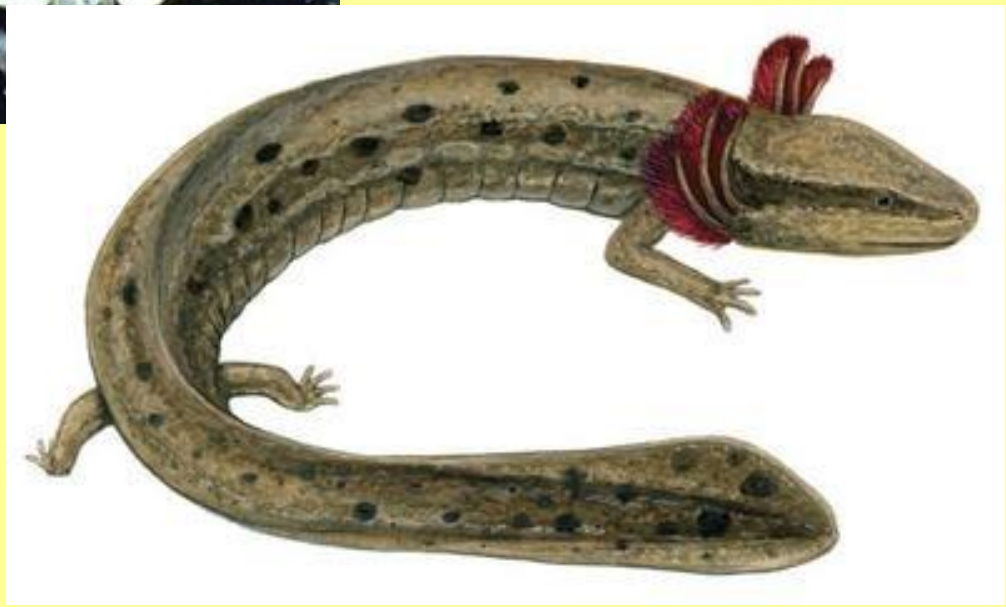
Ordo : Apoda

Familia: Caecilidae



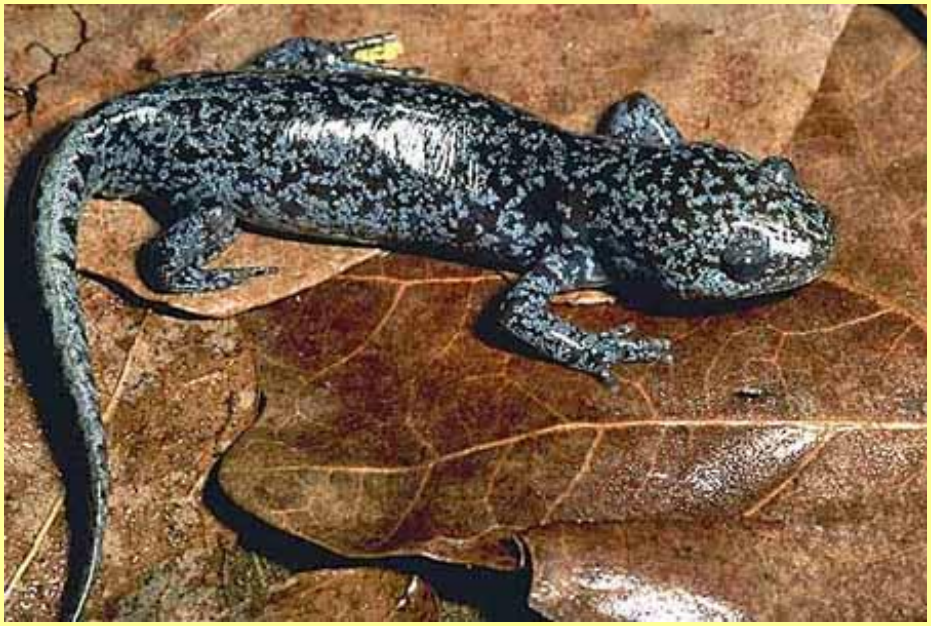
Ordo: Urodela

Necturus



Amphiuma

Ambystoma



Salamandra

Triturus vulgaris

Triturus cristatus

Ordo:Anura

Rana ridibunda

Bufo viridis

Hyla arborea

Classis: Reptilia

Sphenedon

Table 1. Geologic Periods Subsequent to the Time When Fossils First Became Abundant

(The Carboniferous is generally subdivided into two periods, Mississippian [earlier] and Pennsylvanian [later]. The time estimates are based on the rate of disintegration of radioactive materials found in a number of deposits.)

ERA (AND DURATION)	PERIOD	ESTIMATED TIME SINCE BEGINNING OF EACH PERIOD (IN MILLIONS OF YEARS)	EPOCH	LIFE
Cenozoic (age of mammals; about 70 million years)	Quaternary	1	Recent	Modern species and subspecies; dominance of man.
			Pleistocene	Modern species of mammals or their forerunners; decimation of large mammals; widespread glaciation.
	Tertiary	70	Pliocene	Appearance of many modern genera of mammals.
			Miocene	Rise of modern subfamilies of mammals; spread of grassy plains; evolution of grazing mammals.
			Oligocene	Rise of modern families of mammals.
			Eocene	Rise of modern orders and suborders of mammals.
			Paleocene	Dominance of archaic mammals.
Mesozoic (age of reptiles; lasted about 155 million years)	Cretaceous	135		Dominance of angiosperm plants commences; extinction of large reptiles and ammonites by end of period.
	Jurassic	180		Reptiles dominant on land, sea, and in air; first birds; archaic mammals.
	Triassic	225		First dinosaurs, turtles, ichthyosaurs, plesiosaurs; cycads and conifers dominant.
Paleozoic (lasted about 375 million years)	Permian	270		Radiation of reptiles, which displace amphibians as dominant group; widespread glaciation.
	Carboniferous	350		Fern and seed fern coal forests; sharks and crinoids abundant; radiation of amphibians; first reptiles.
	Devonian	400		Age of fishes (mostly fresh water); first trees, forests and amphibians.
	Silurian	440		Invasion of the land by plants and arthropods; archaic fishes.
	Ordovician	500		Appearance of vertebrates (ostracoderms); brachiopods and cephalopods dominant.
	Cambrian	600		Appearance of all major invertebrate phyla and many classes; dominance of trilobites and brachiopods; diversified algae.

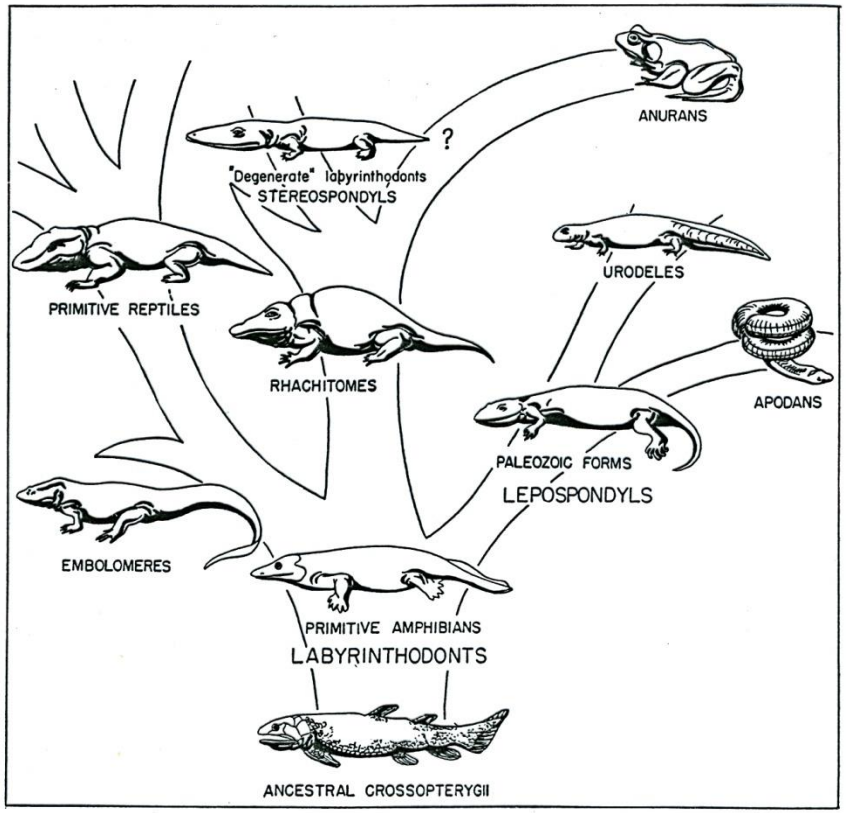


Fig. 36. A "family tree" of the Amphibia. The surviving groups are shown at the upper right. Urodeles, apodans and their fossil relatives are commonly grouped as lepospondyls, as contrasted with the labyrinthodonts; the frogs have been generally regarded as derived from labyrinthodonts, but this is far from certain. The various groups of labyrinthodonts are named from vertebral types discussed in Chapter 7.

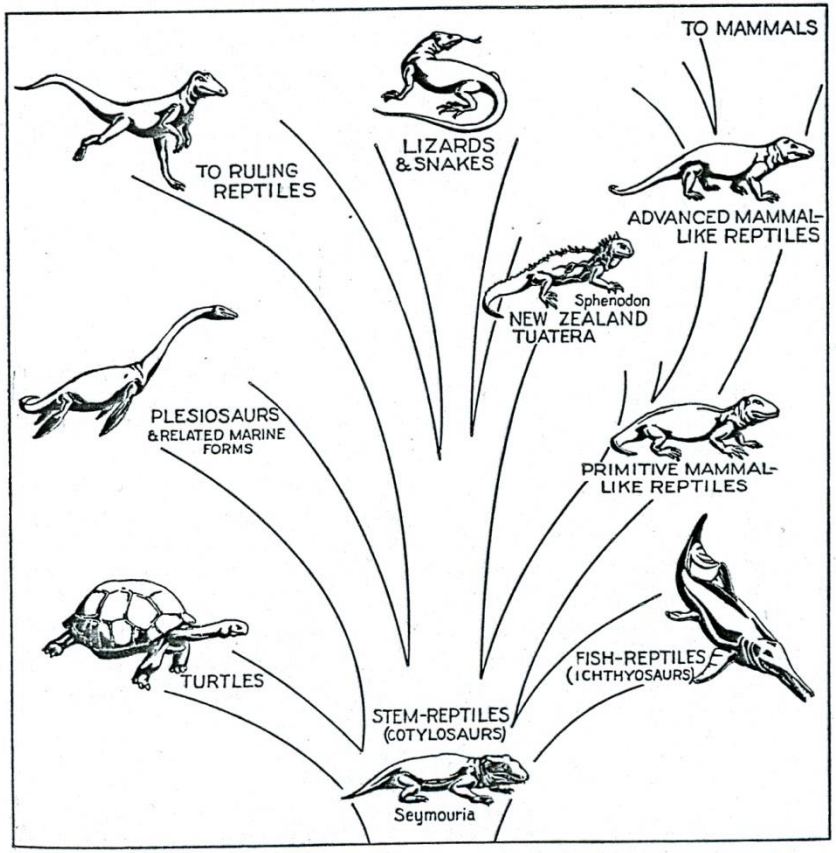


Fig. 37. A simple family tree of the reptiles (ruling reptiles not included). (From Romer, The Vertebrate Story, University of Chicago Press.)

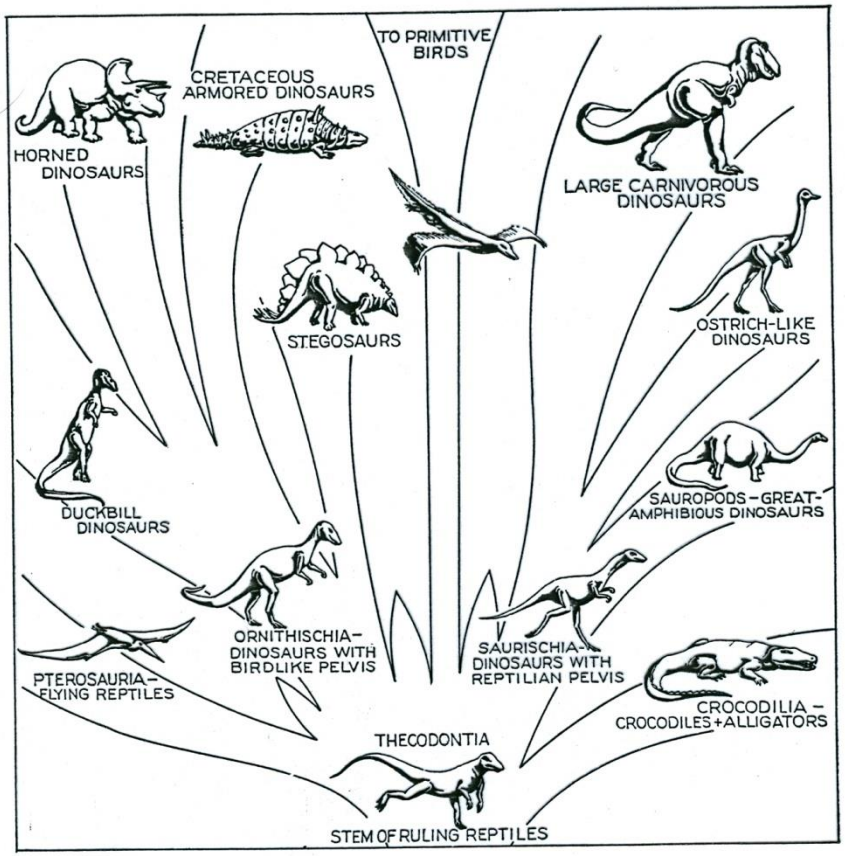


Fig. 38. A simple family tree of the ruling reptiles. (From Romer, The Vertebrate Story, University of Chicago Press.)

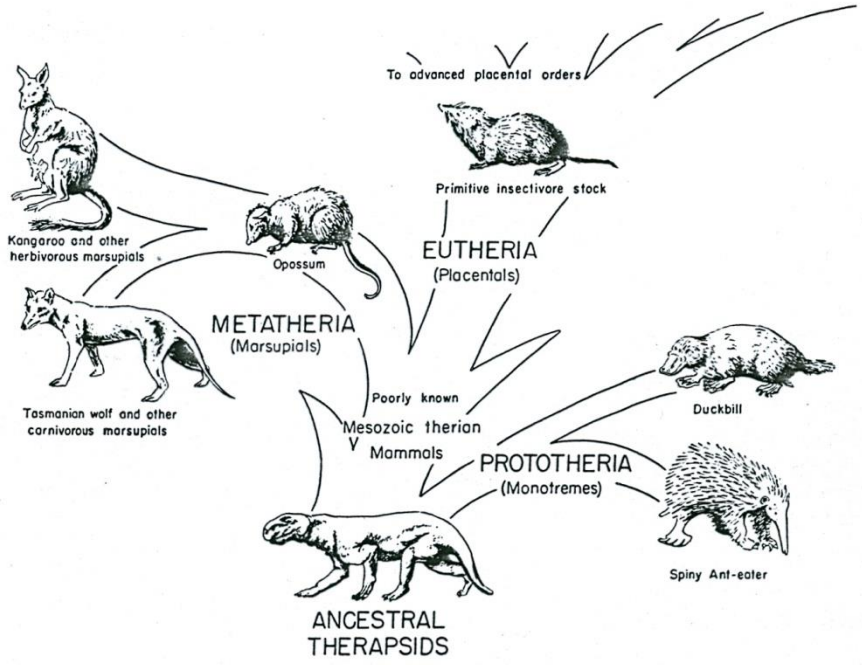


Fig. 43. Diagrammatic family tree, to show the evolution and relationship of the major groups of mammals.

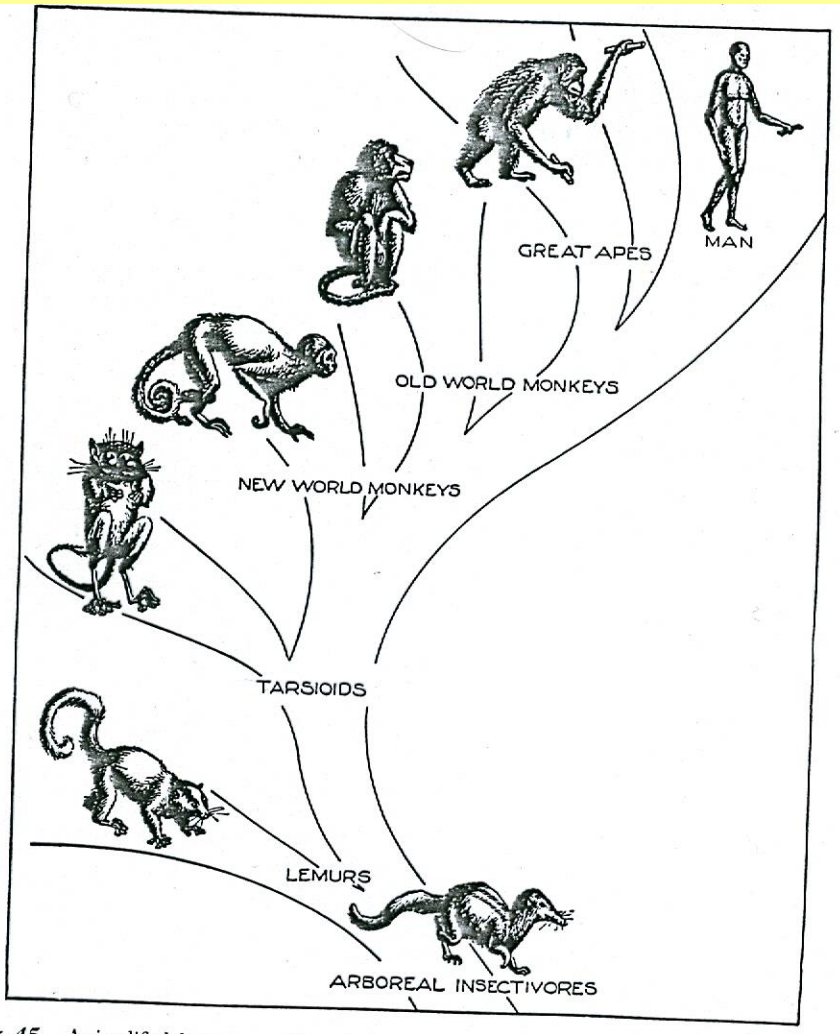


Fig. 45. A simplified family tree of the primates. (From Romer, The Vertebrate Story, University of Chicago Press.)

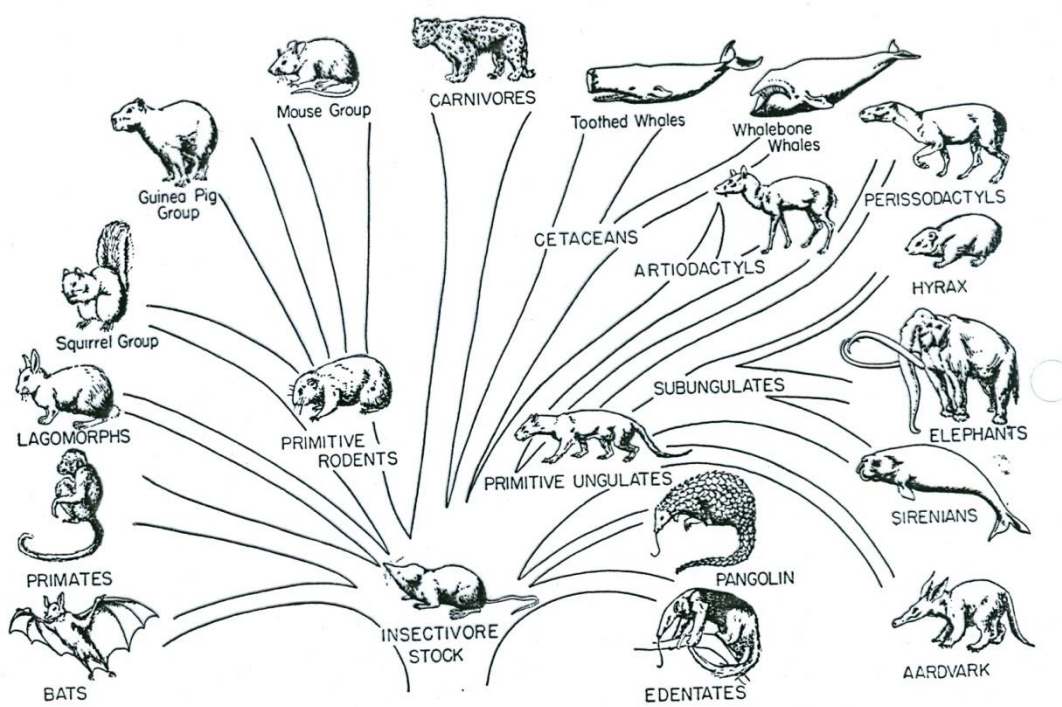
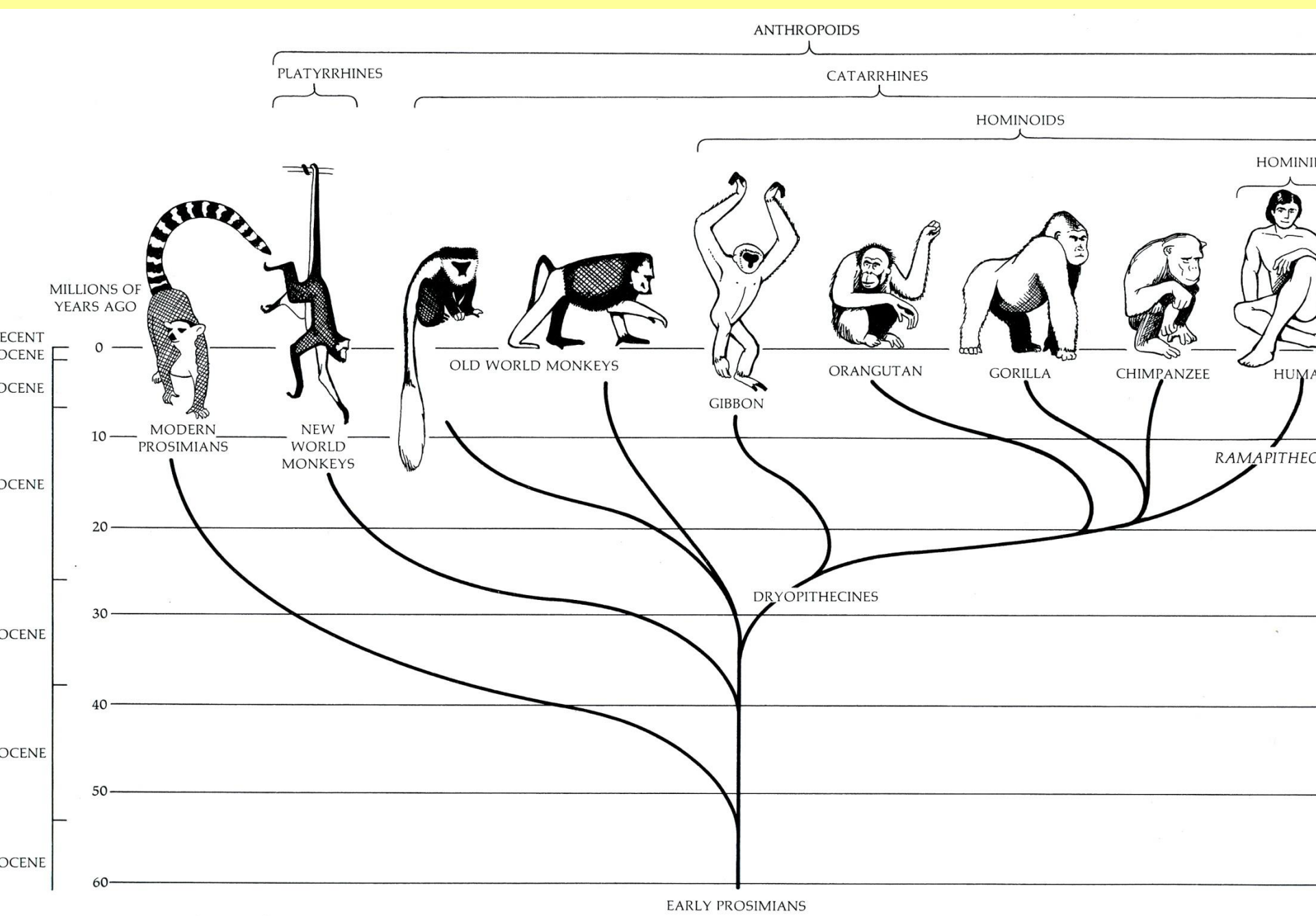
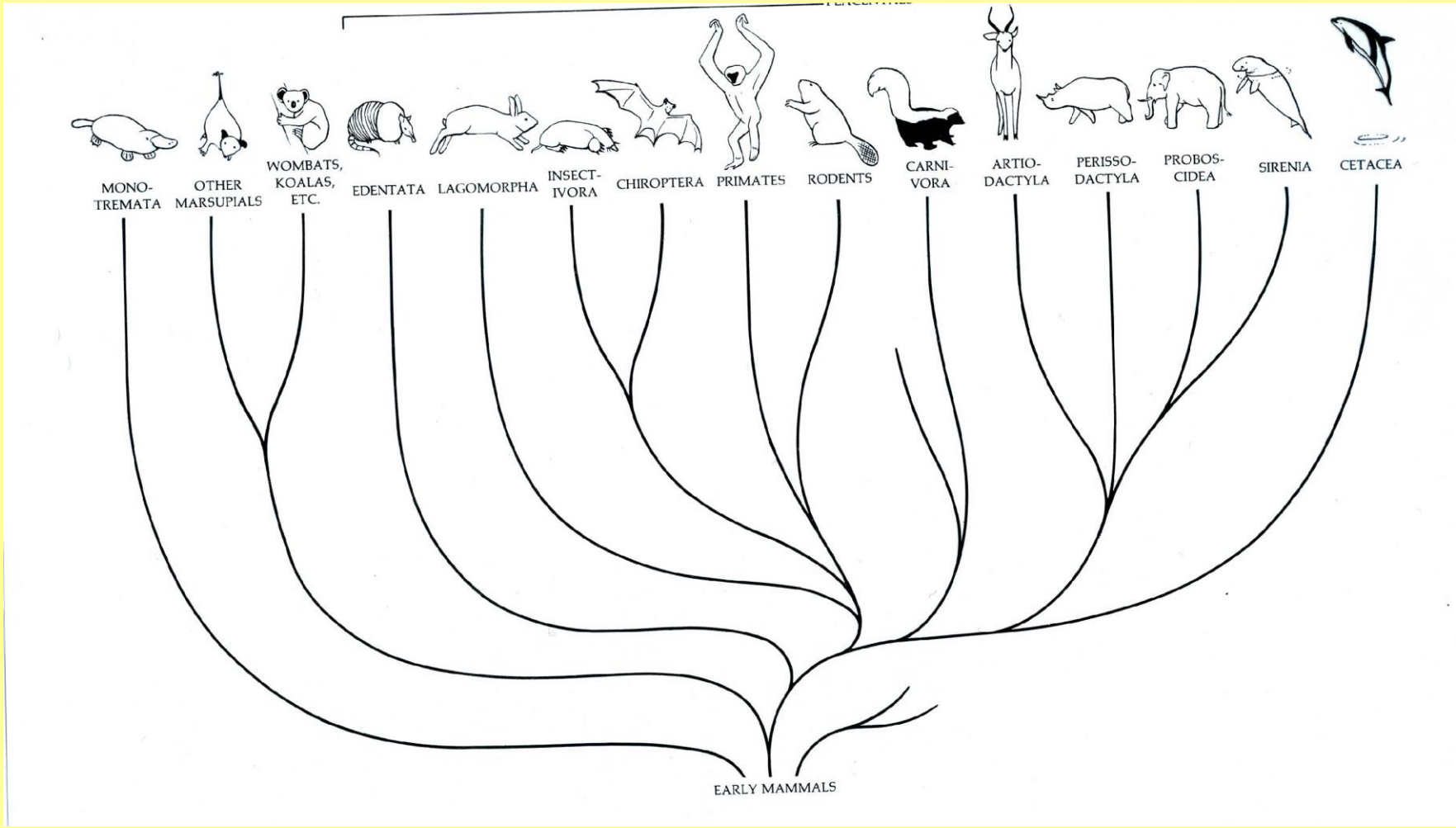


Fig. 44. Diagrammatic family tree of the orders of eutherian (placental) mammals. Separate diagrams (Figs. 45–48) give in more detail the evolution of primates, carnivores, and odd- and even-toed ungulates.


ANTHROPOIDS
PLATYRRHINES
CATARRHINES
HOMINOIDS
HOMINI
MILLIONS OF YEARS AGO
ECENT
OCENE
OCENE
OCENE
OCENE
OCENE
0
10
20
30
40
50
60
MODERN PROSIMIANS
NEW WORLD MONKEYS
OLD WORLD MONKEYS
GIBBON
ORANGUTAN
GORILLA
CHIMPANZEE
HUMA
RAMAPITHEC
DRYOPITHECINES
EARLY PROSIMIANS


MONO-
TREMATA
OTHER
MARSUPIALS
WOMBATS,
KOALAS,
ETC.
EDENTATA
LAGOMORPHA
INSECT-
IVORA
CHIROPTERA
PRIMATES
RODENTS
CARNI-
VORA
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SIRENIA
CETACEA
EARLY MAMMALS

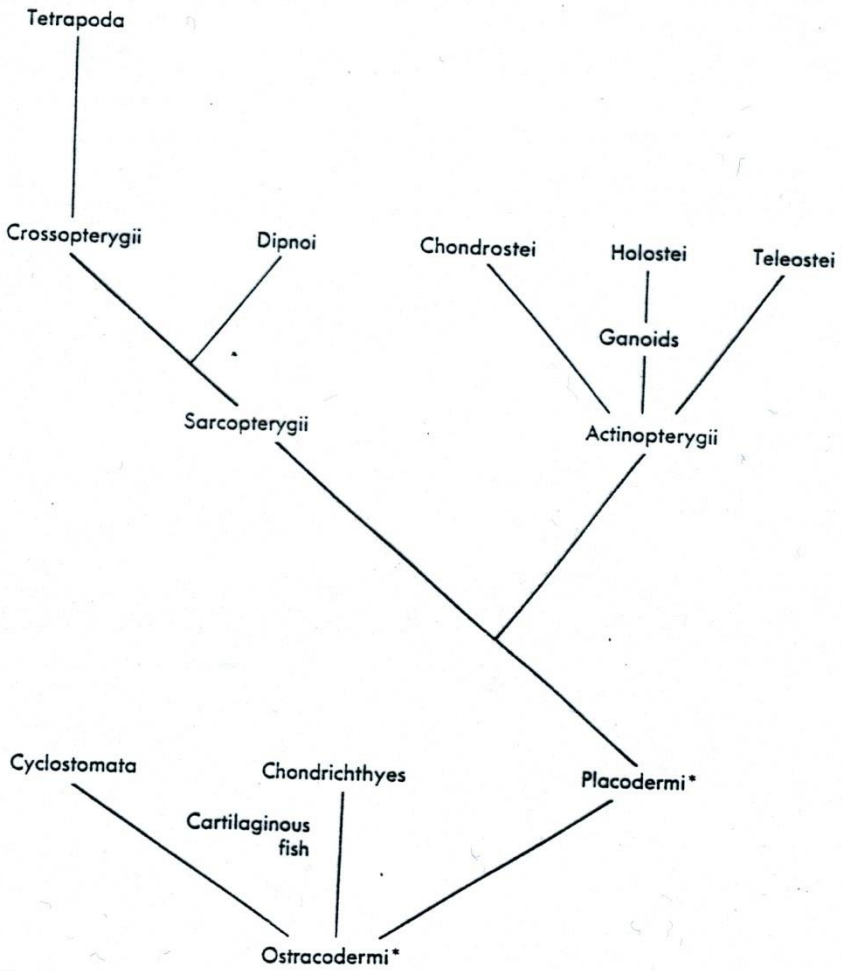

Fig. 3-11. Theoretical phylogenetic lines of fishes. Asterisked taxa are totally extinct. The distribution of fishes in time is given in Fig. 3-3.

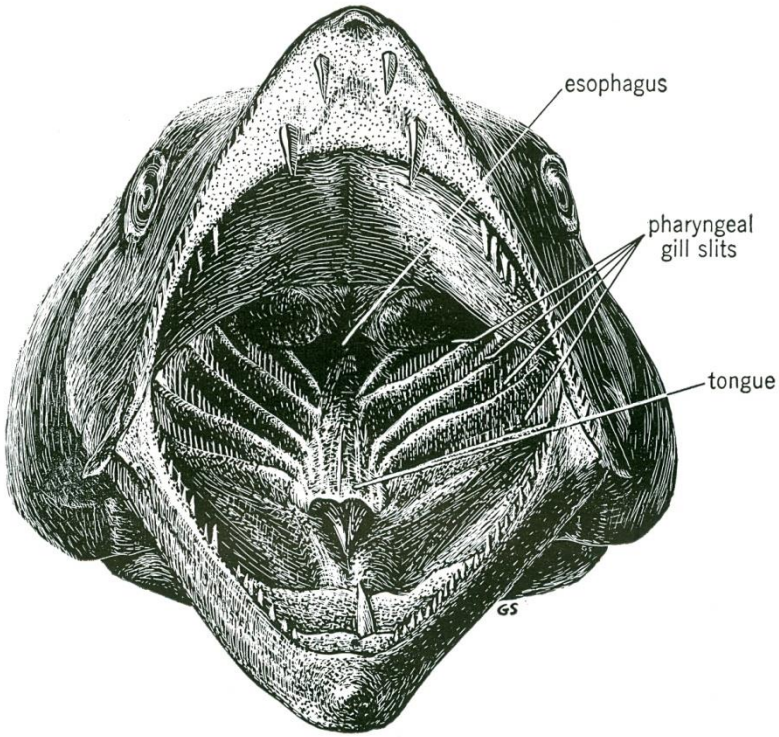

FIG. 1.4. The open mouth of a fish, the barracuda, showing the typical relation of gill slits to the pharynx.

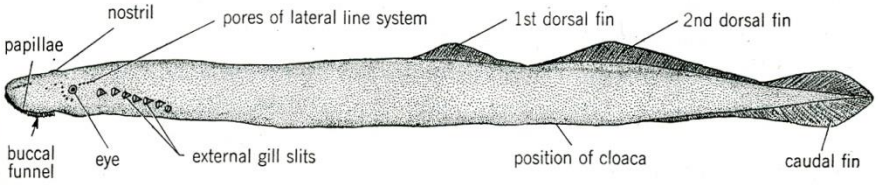

FIG. 2.8. *A*, lateral view of lamprey, *Petromyzon marinus; B*, the glutinous hagfish, *Myxine glutinosa*.

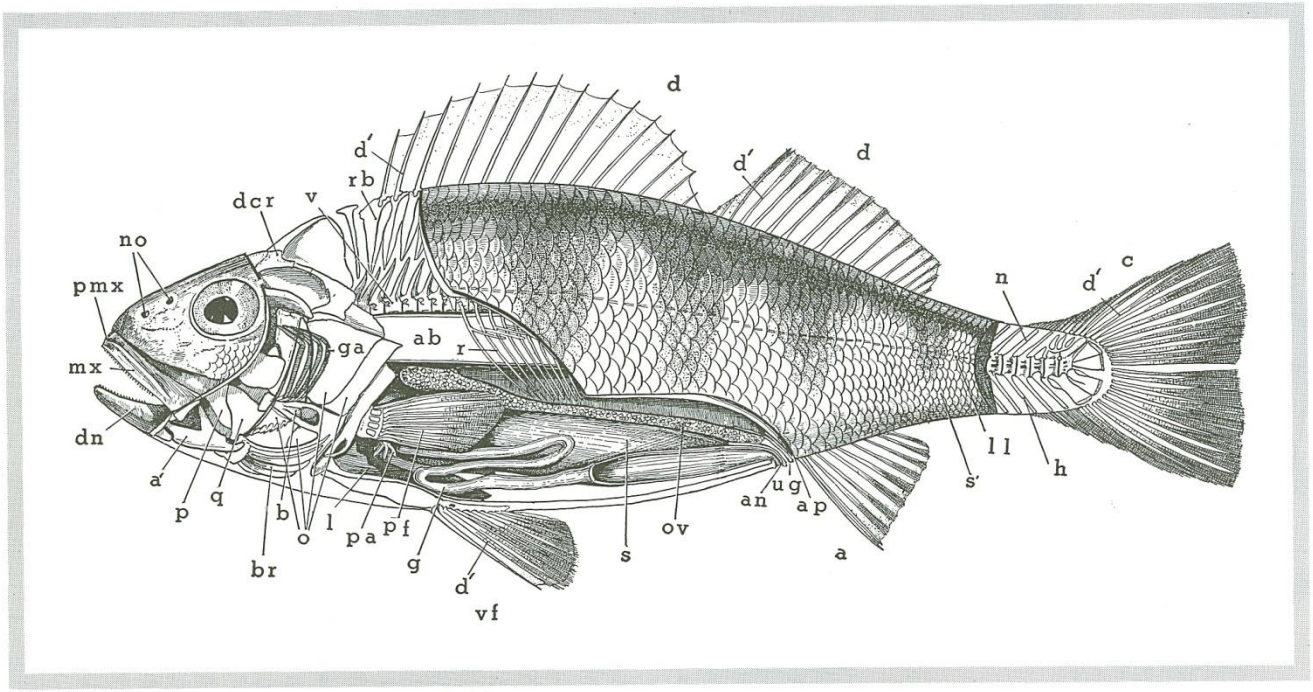

Fig. 32. Diagrammatic dissection of a teleost, the perch (Perca). *a*, Anal fin; *ab*, air bladder; *an*, anus; *ap*, abdominal pore; *a′*, articular; *b*, bulbus arteriosus (conus arteriosus); *br*, branchiostegal rays; *c*, caudal fin; *d*, dorsal fins; *d′*, dermal rays of fins; *dn*, dentary; *dcr*, dorsal crest of skull; *g*, intestine; *ga*, gill arches; *h*, hemal spines (expanded to hypurals in tail fin); *l*, liver; *ll*, lateral line; *mx*, maxilla; *n*, neural spines; *no*, nasal openings; *o*, opercular bones; *ov*, ovary; *p*, pterygoid; *pa*, pyloric appendices; *pf*, pectoral fin; *pmx*, premaxilla; *q*, quadrate; *r*, ribs; *rb*, basal fin supports; *s*, stomach; *s′*, scales; *ug*, urogenital opening; *v*, vertebral centra; *vf*, pelvic (ventral) fin. (From Dean.)

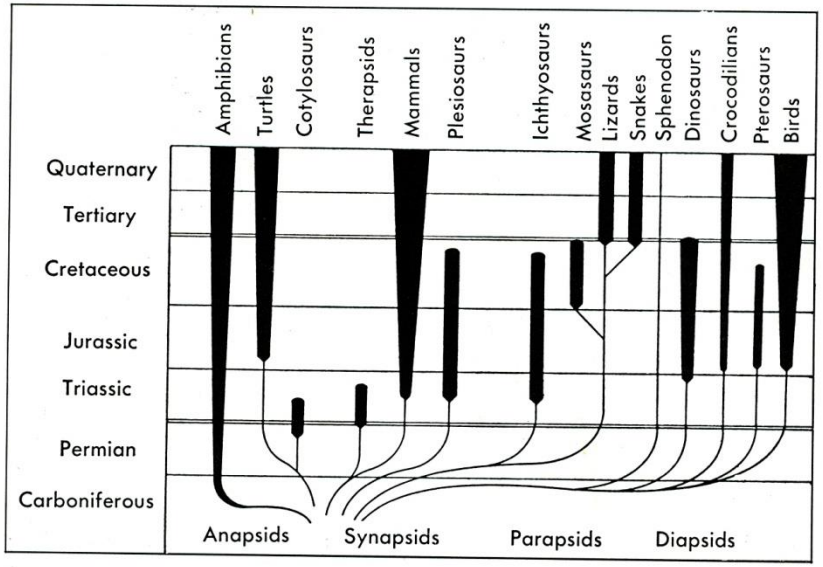

Fig. 3-19. Geological chart of amphibians and amniotes to show their range through time. (From Atwood: Comparative anatomy, ed. 2, St. Louis, 1955, The C. V. Mosby Co.)

Fig. 3-20. A, *Archaeopteryx,* the earliest known bird of the Jurassic period. **B,** A pigeon, for comparison. How many skeletal changes can you find? (From Colbert: Evolution of the vertebrates, New York, 1955, John Wiley & Sons, Inc.)

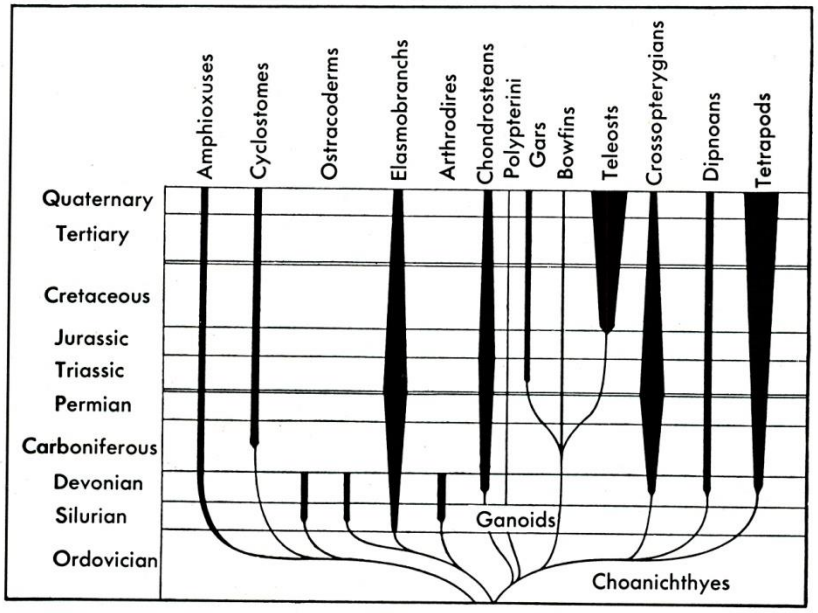

Fig. 3-3. Geological chart of fishes showing their range and relative abundance through time. (From Atwood: Comparative anatomy, ed. 2, St. Louis, 1955, The C. V. Mosby Co.)

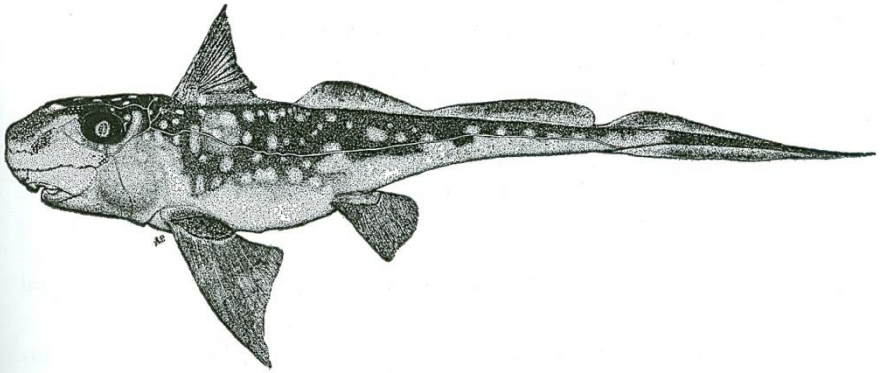

FIG. 2.11. Lateral view of *Chimaera monstrosa*. (*Drawn by A. Page.*)

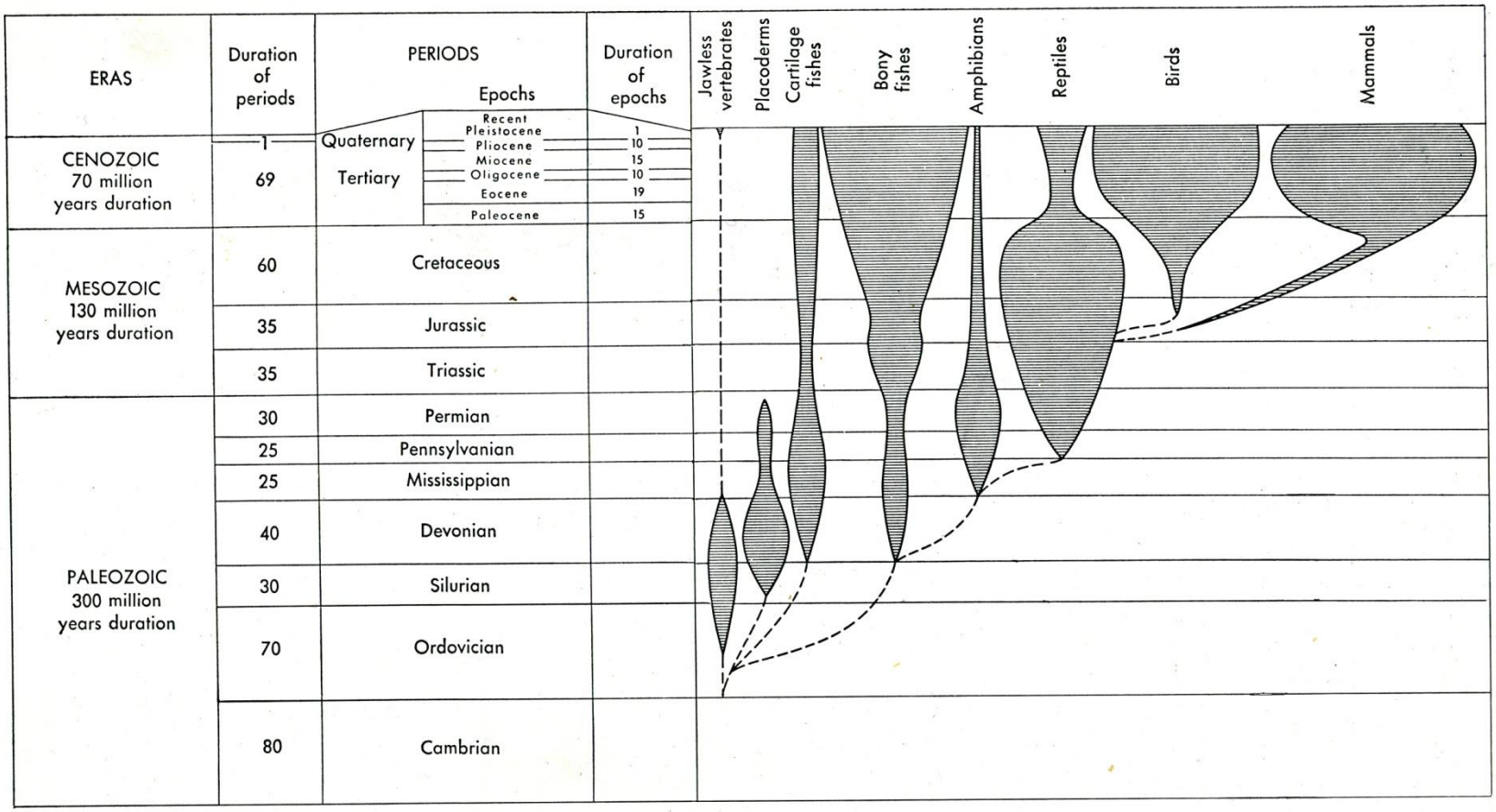

Fig. 3-31. Chart of geological time and a simplified family tree of the vertebrate classes showing their relative abundance through time. Duration of periods is in millions of years. (From Colbert: Evolution of the vertebrates, New York, 1955, John Wiley & Sons, Inc.)