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January, 1962

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ATLAS OF FISH ANATOMY ¹

by

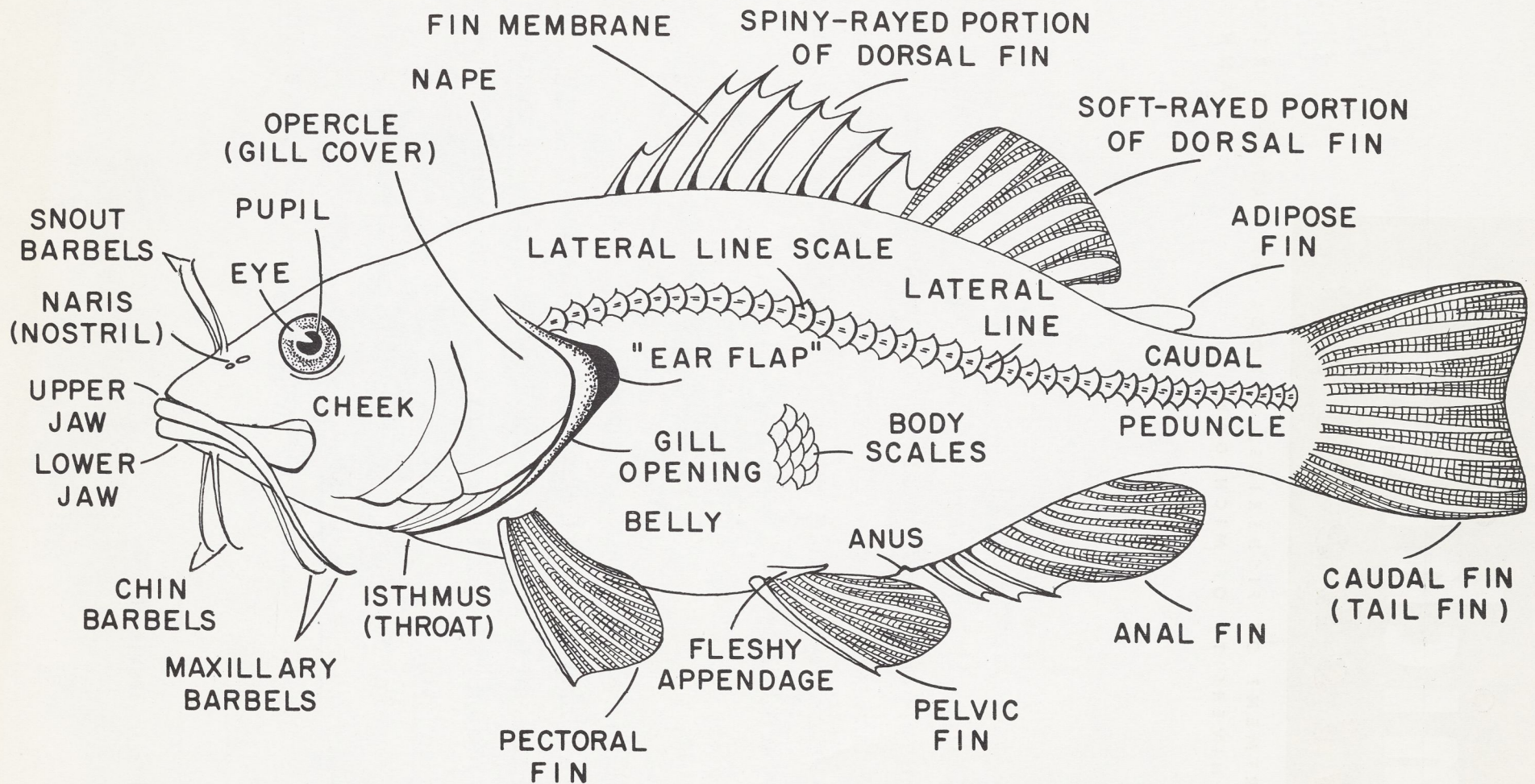
Karl F. Lagler

This atlas is prepared as a teaching aid in fish biology. Multiple copies are available from the Department of Fisheries at cost. I would welcome the contribution of useful anatomical drawings by others. These would be included in future editions, with full credit as to source. Suggestions would be welcome regarding desirable inclusions, either to be originated or to be borrowed from published sources.

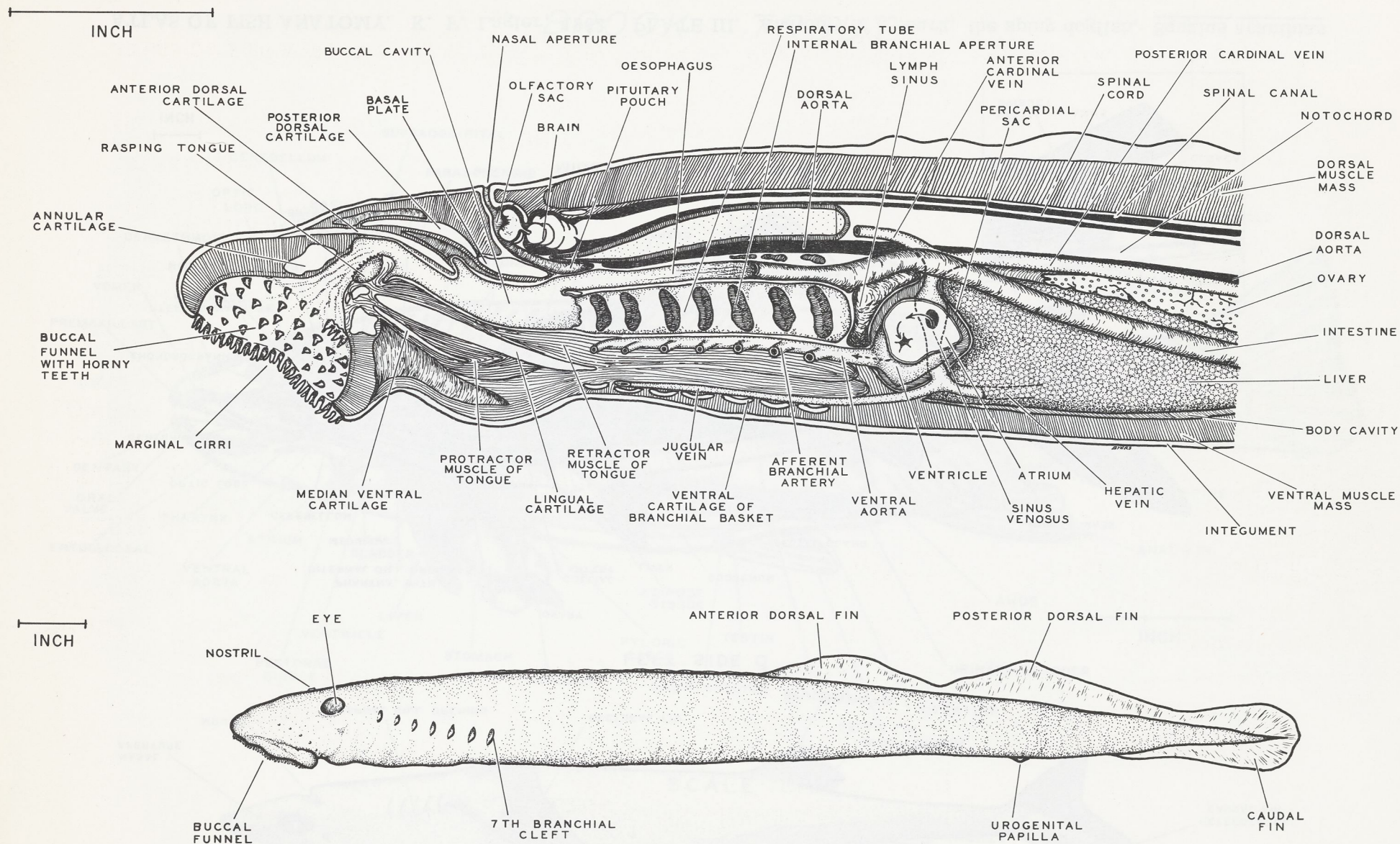
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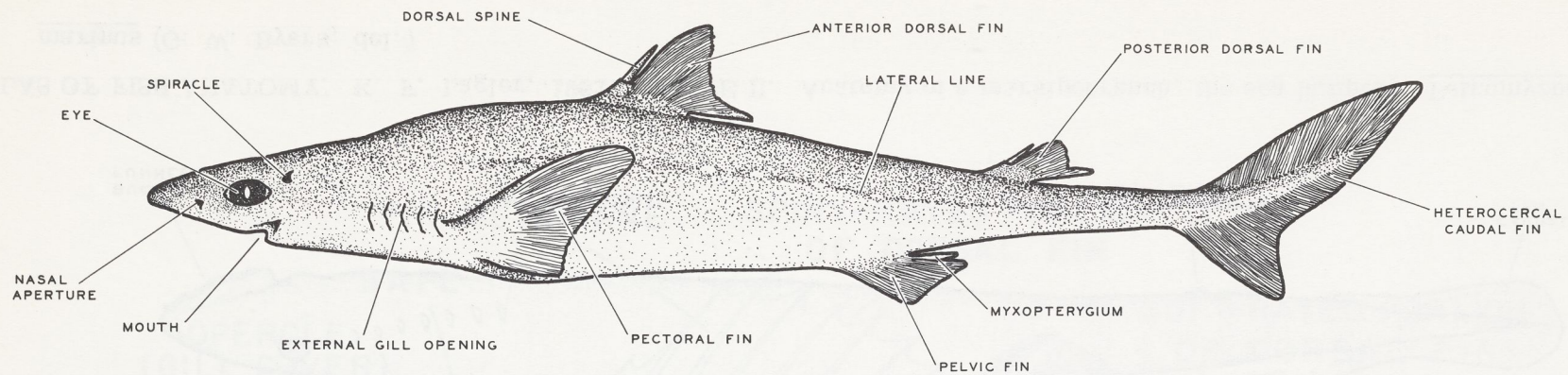
¹Second Edition, Revised



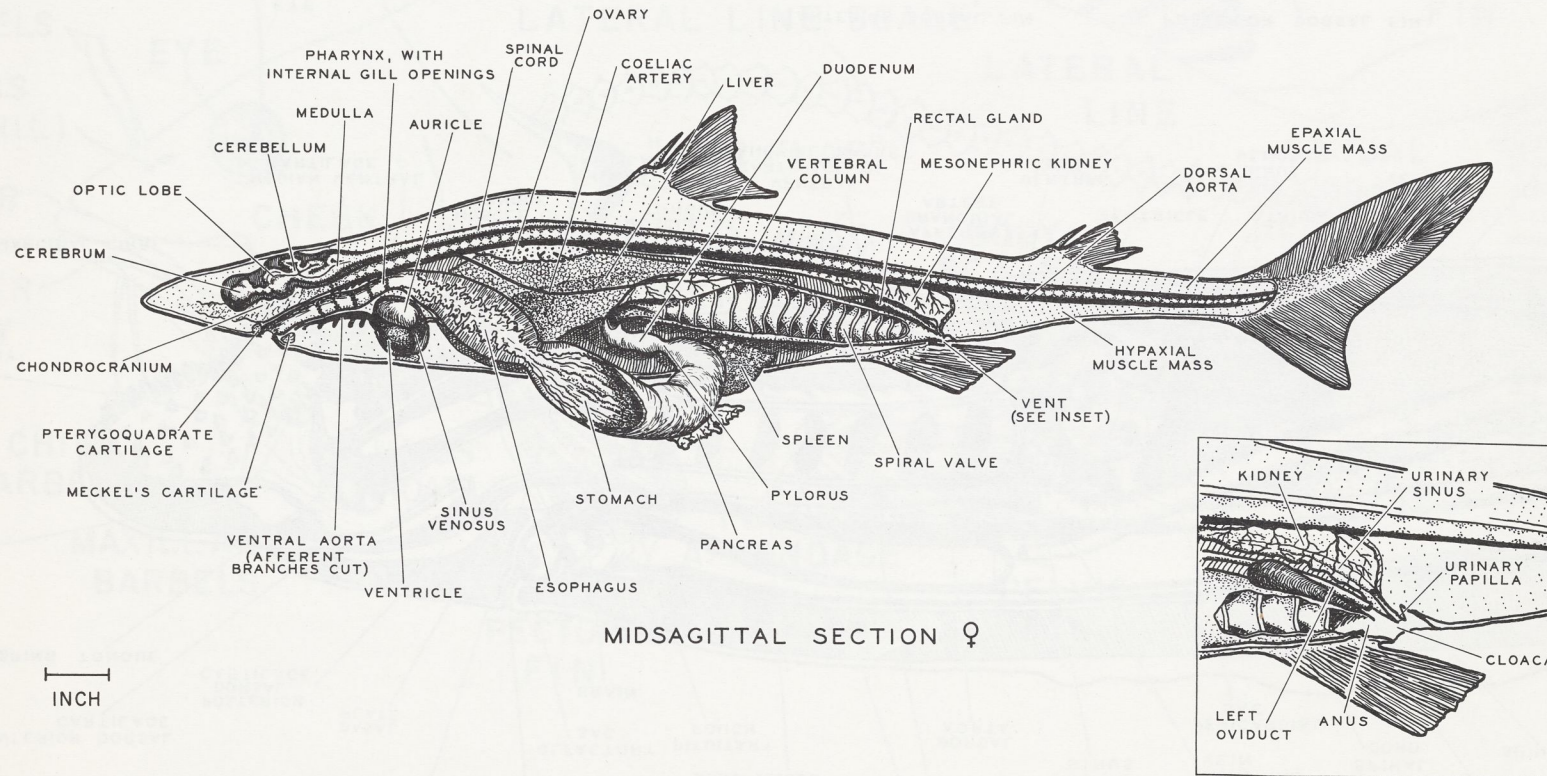
ATLAS OF FISH ANATOMY. K. F. Lagler, 1962. PLATE I. External features of a composite fish (Q. Carlson, del.)



ATLAS OF FISH ANATOMY. K. F. Lagler, 1962. PLATE II. Anatomy of a marsipobranch, the sea lamprey, *Petromyzon marinus* (G. W. Byers, del.)



LEFT SIDE ♂

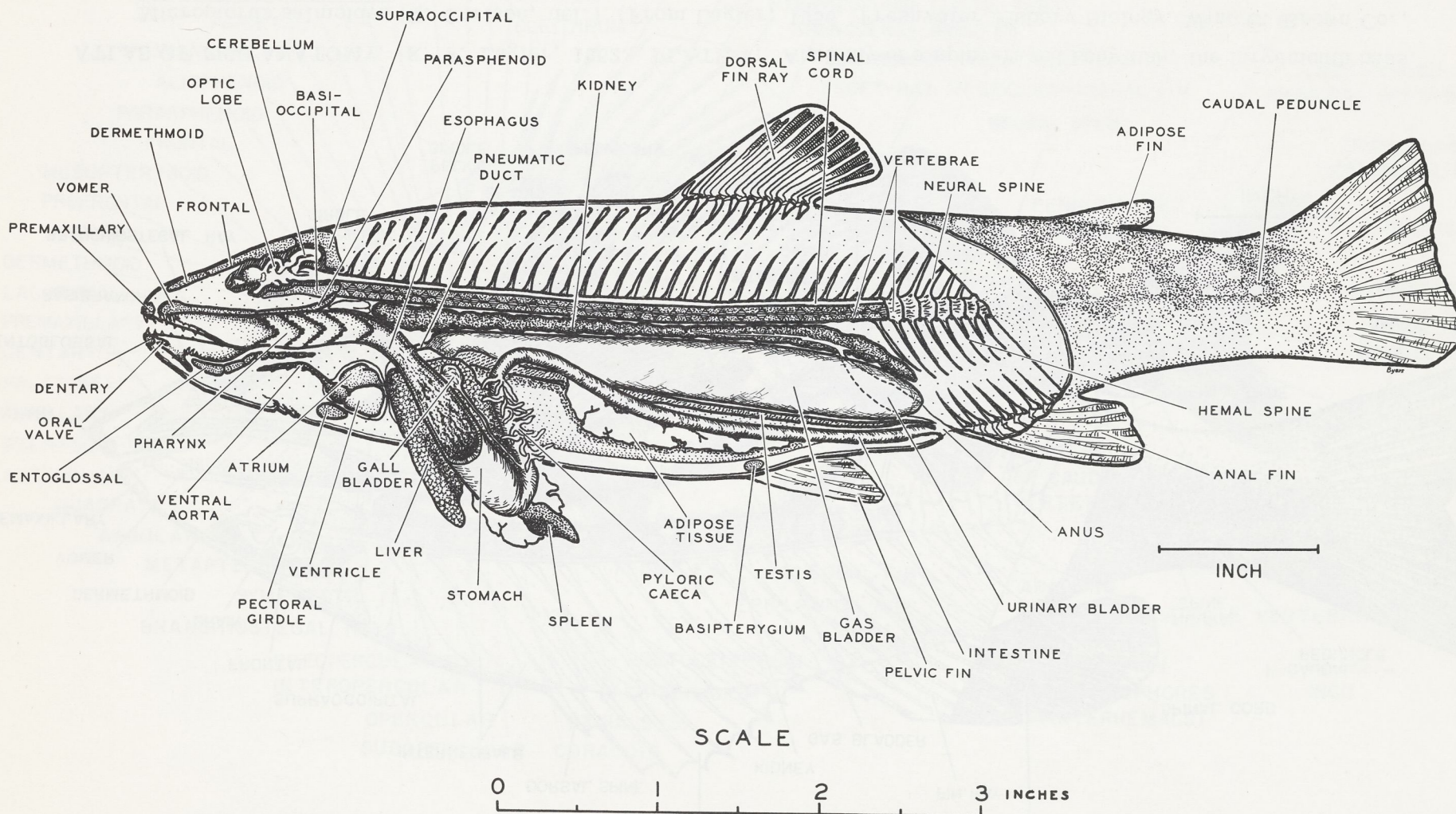


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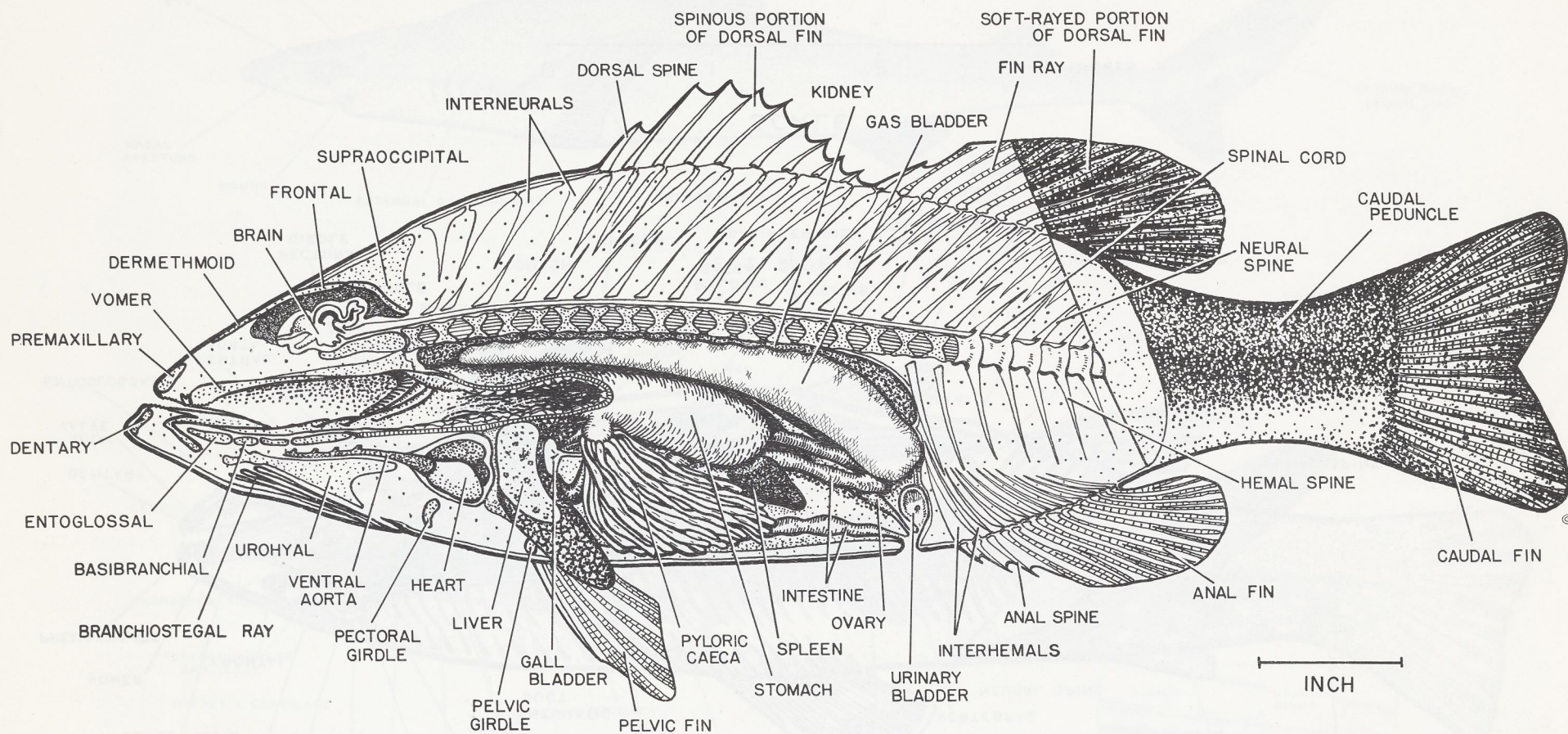
INCH

ATLAS OF FISH ANATOMY. K. F. Lagler, 1962. PLATE III. Anatomy of a shark, the spiny dogfish, Squalus acanthias (G. W. Byers, del.)

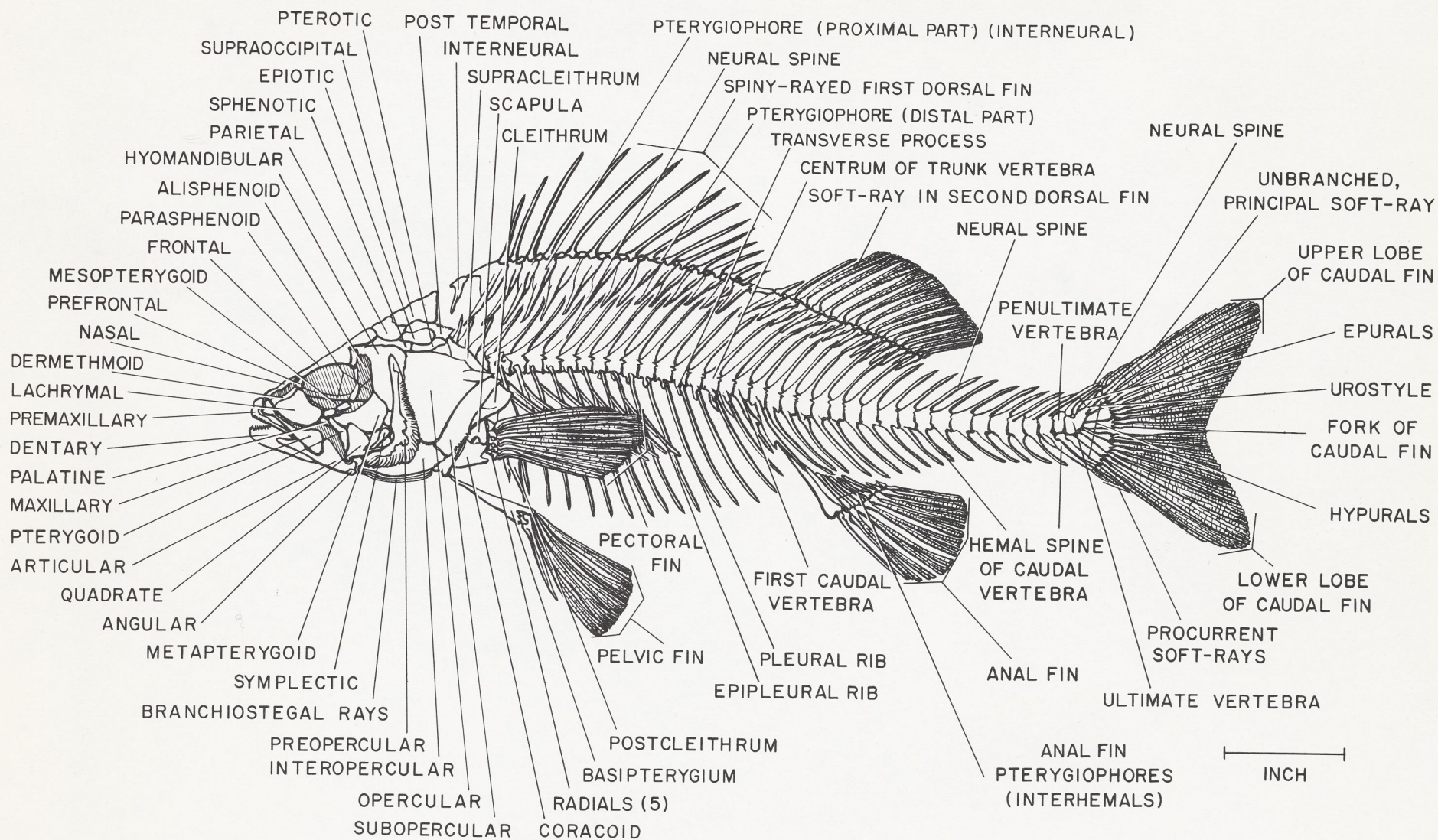
INTERNAL ANATOMY OF THE BROOK TROUT



ATLAS OF FISH ANATOMY. K. F. Lagler, 1962. PLATE IV. Anatomy of a soft-rayed bony fish, the brook trout, *Salvelinus fontinalis* (G. W. Byers, del.) (From Lagler, 1956, Freshwater Fishery Biology, Wm. C. Brown Co., Dubuque, Iowa)



ATLAS OF FISH ANATOMY. K. F. Lagler, 1962. PLATE V. Anatomy of a spiny-rayed bony fish, the largemouth bass, *Micropterus salmoides* (Q. Carlson, del.) (From Lagler, 1956, *Freshwater Fishery Biology*, Wm. C. Brown Co., Dubuque, Iowa)



ATLAS OF FISH ANATOMY. K. F. Lagler, 1962. PLATE VI. Skeleton of a spiny-rayed bony fish, the yellow perch, *Perca flavescens* (J. N. Richman, del.)

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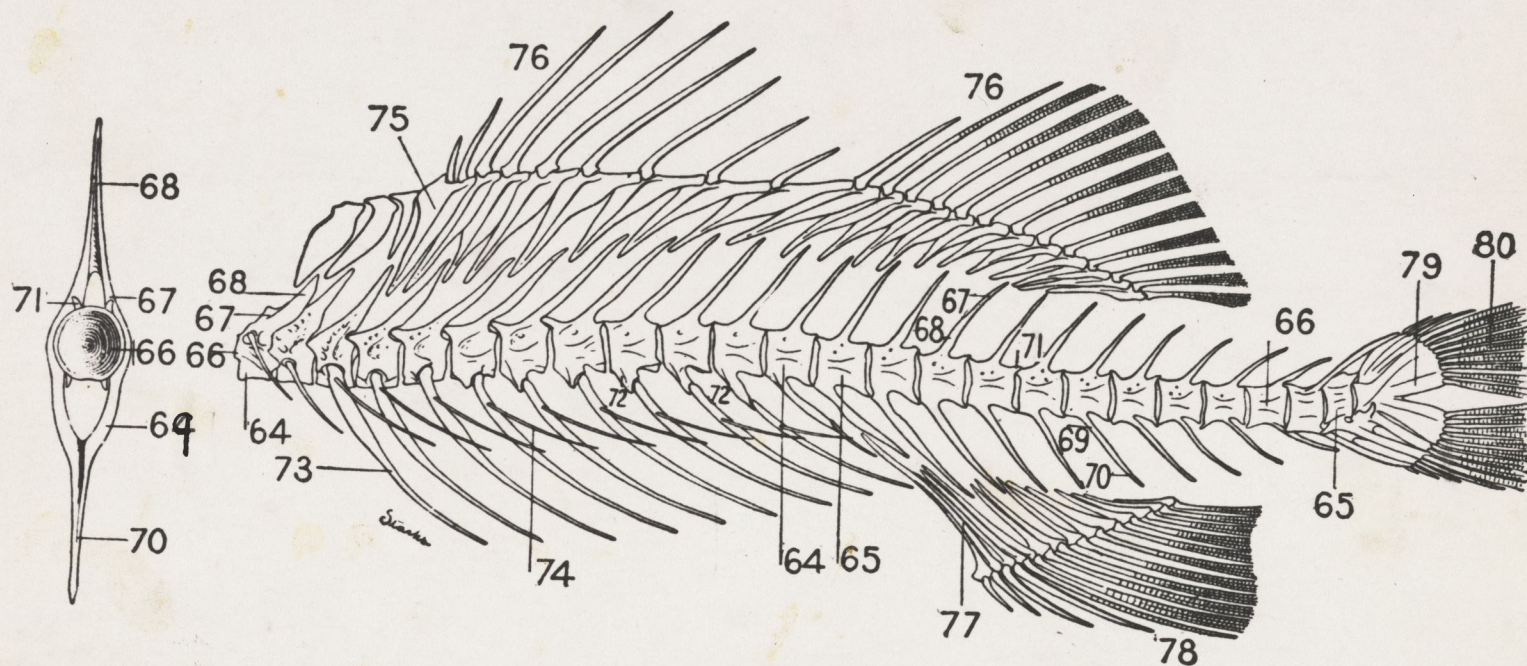
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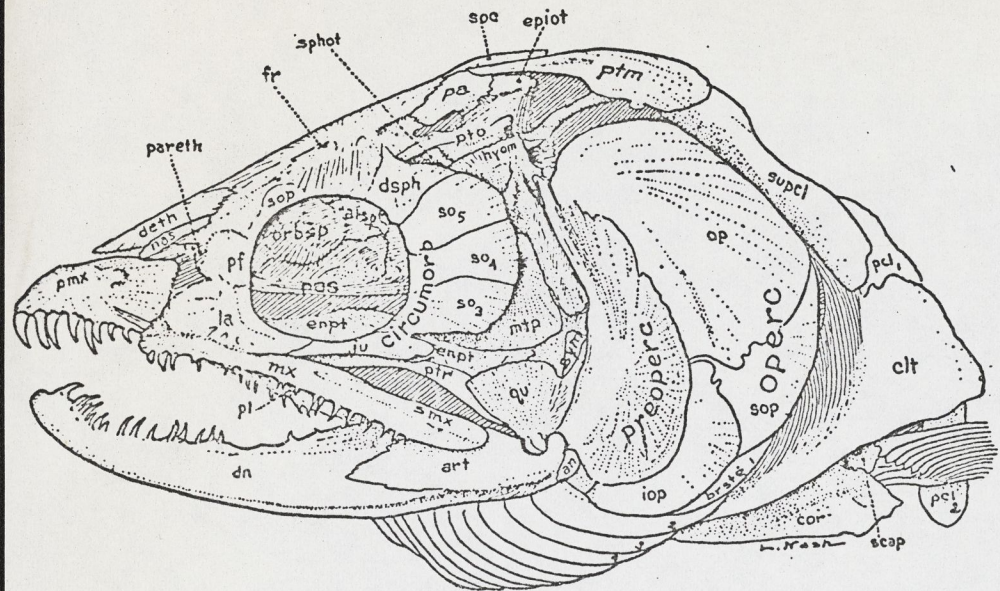
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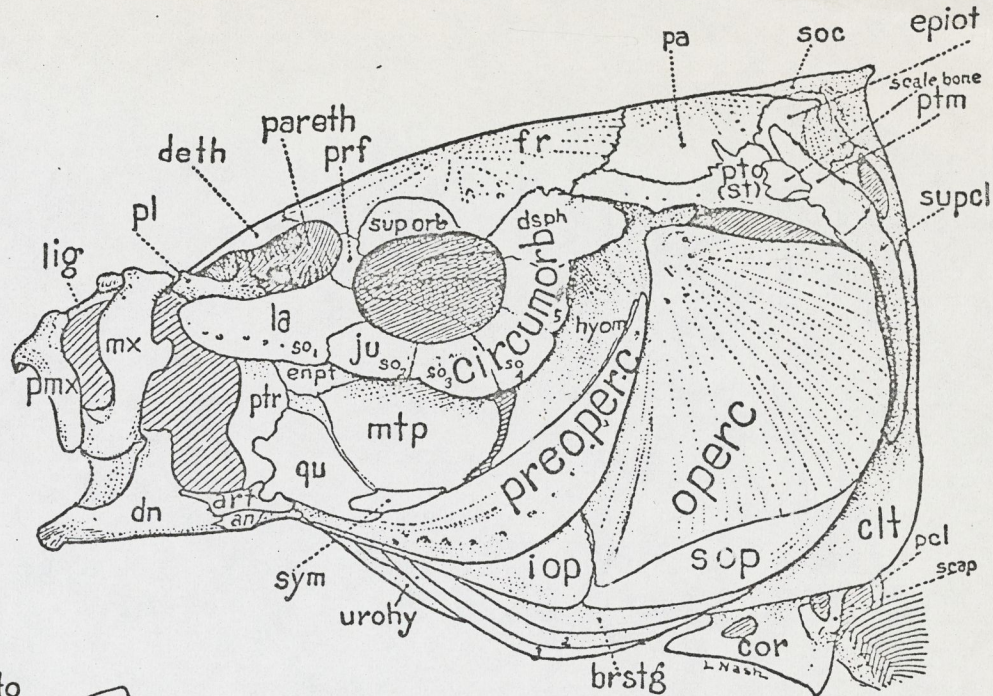


—*Roccus lineatus*. Vertebral column and appendages, with a typical vertebra. (After Starks.)

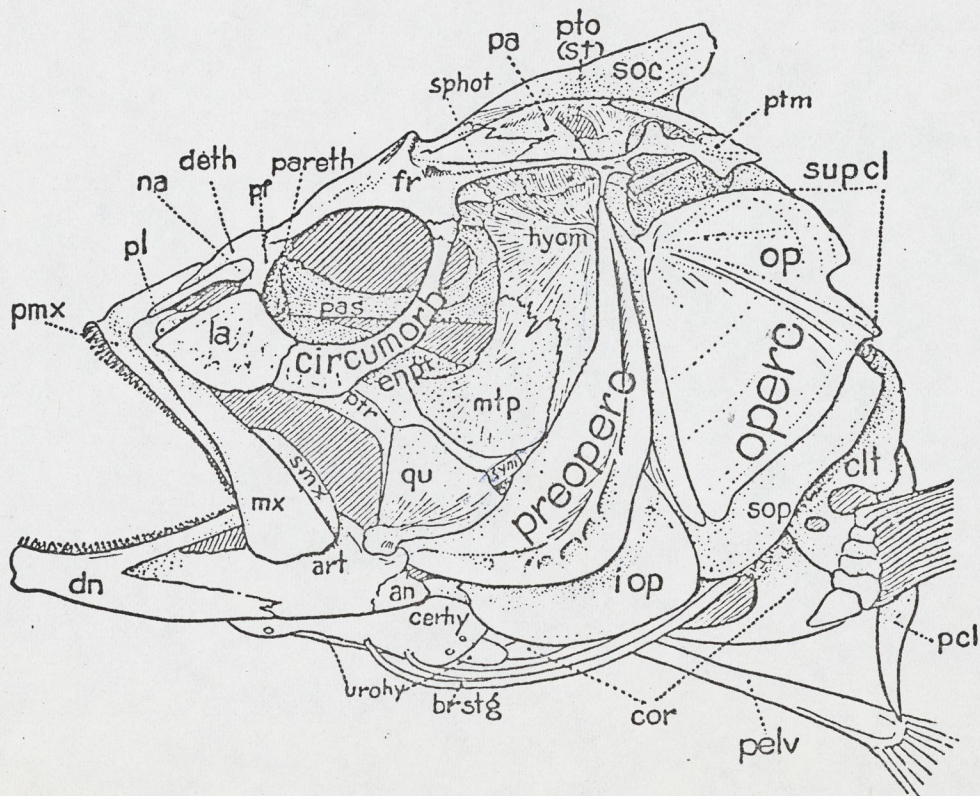
- | | | |
|-------------------------|-------------------|-----------------|
| 64. Abdominal vertebræ. | 70. Hæmal spine. | 76. Dorsal fin. |
| 65. Caudal vertebræ. | 71. Zygapophysis. | 77. Interhæmal. |
| 66. Centrum. | 72. Parapophysis. | 78. Anal fin. |
| 67. Neurapophysis. | 73. Ribs. | 79. Hypural. |
| 68. Neural spine. | 74. Epipleurals. | 80. Caudal fin. |
| 69. Hæmapophysis. | 75. Interneural. | |



Salmo sp.



Cyprinus carpio



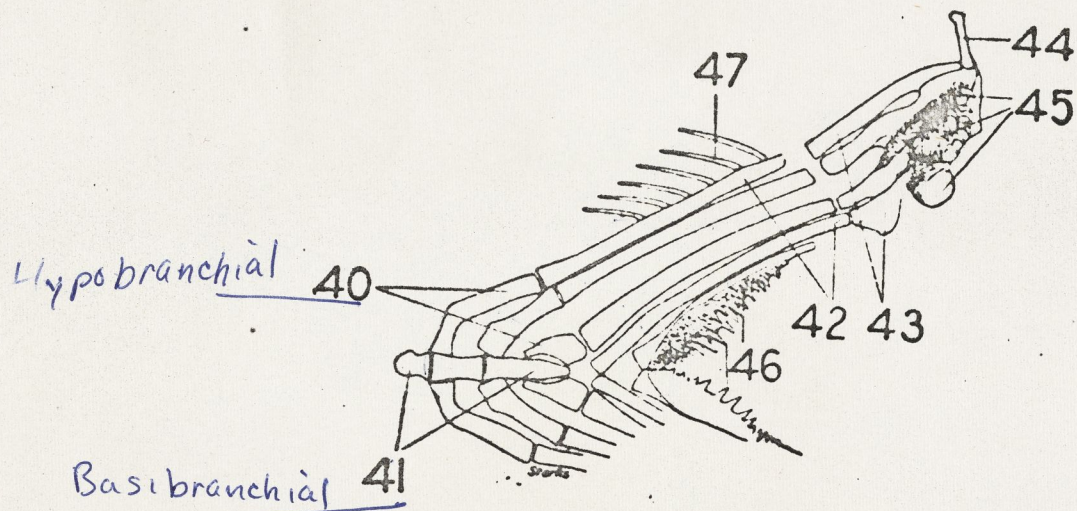
Micropterus dolomieu

From: Gregory, W.K 1959

Fish skulls, a study
of the evolution of
natural mechanisms.
481 p.

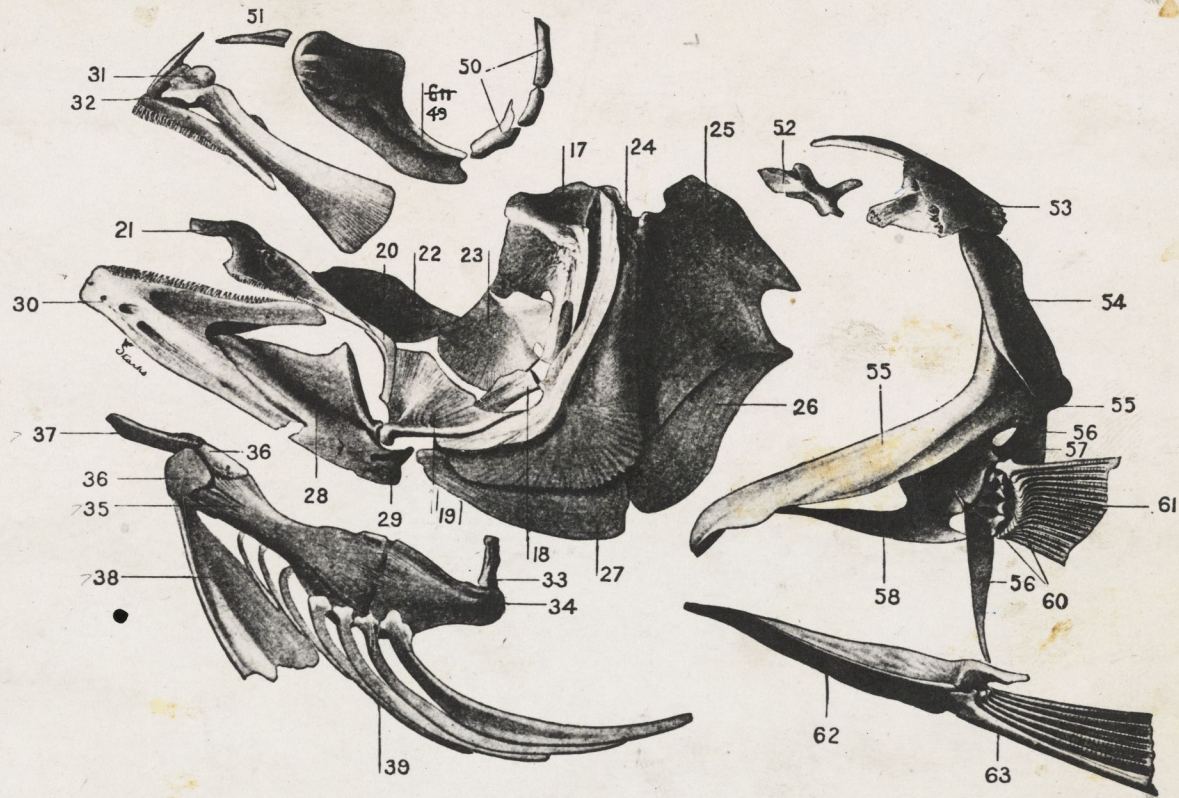
- originally in:

Amer. Philosophical
Soc. 23: Pt II, 1933.

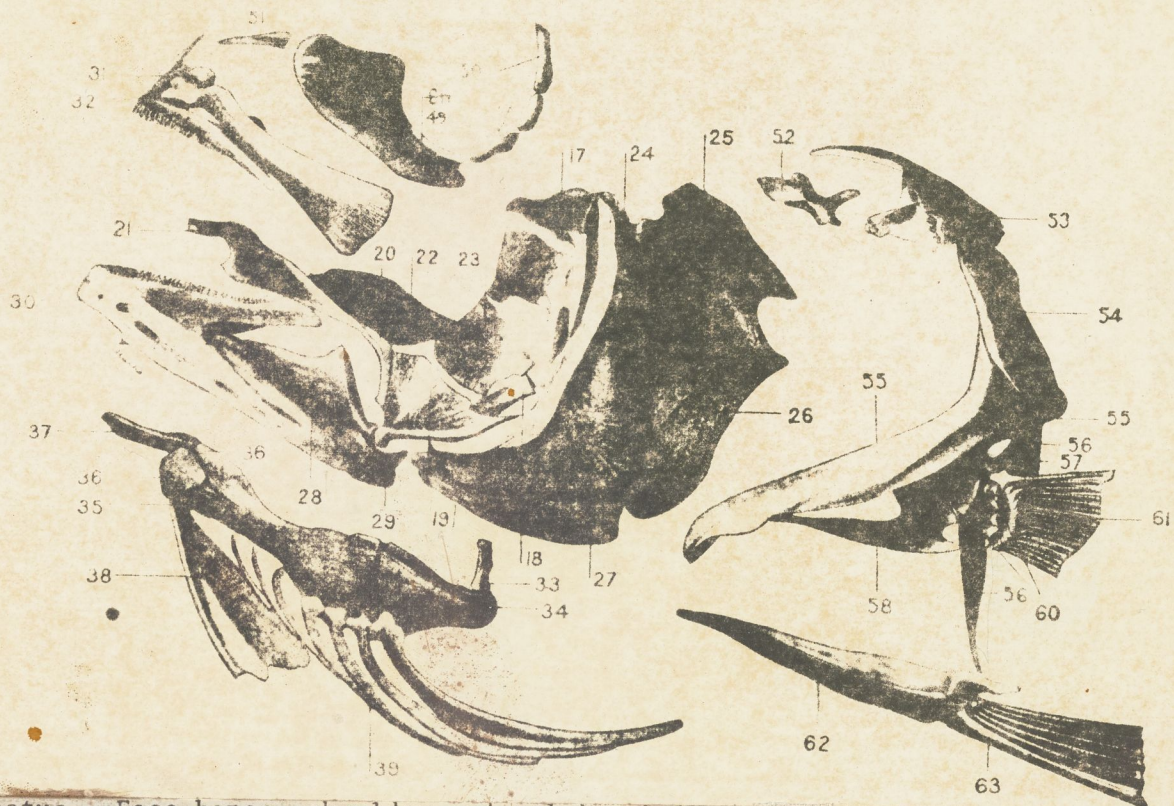


—*Roccus lineatus*. Branchial arches. (After Starks.)

- | | | |
|----------------------|---|------------------------|
| 40. Basibranchial. | 43. Epibranchial. | 46. Lower pharyngeals. |
| 41. Hypobranchial. | 44. Suspensory pharyngeal. | 47. Gill-rakers. |
| 42. Ceratobranchial. | 45. Upper pharyngeals.
(Pharyngobranchial) | |



- Roccus lineatus*. Face-bones, shoulder and pelvic girdles, and hyoid arch.
- | | | | | | | |
|--------------------|--------------------|-------------------|-----------------|----------------------|--------------------|--------------------|
| 17. Hyomandibula. | 23. Metapterygoid. | 29. Angular. | 34. Epihyal. | 39. Branchiostegals. | 53. Post-temporal. | 58. Hypocoracoid. |
| 18. Symplectic. | 24. Preopercle. | 30. Dentary. | 35. Ceratohyal. | 49. Preorbital. | 54. Supracoracoid. | 60. Actinosts. |
| 19. Quadrate. | 25. Opercle. | 31. Maxillary. | 36. Basihyal. | 50. Suborbital. | 55. Clavicle. | 61. Pectoral fin. |
| 20. Pterygoid. | 26. Subopercle. | 32. Premaxillary. | 37. Glossohyal. | 51. Nasal. | 56. Postclavicle. | 62. Pelvic girdle. |
| 21. Palatine. | 27. Interopercle. | 33. Interhyal. | 38. Urohyal. | 52. Supratemporal. | 57. Hypercoracoid. | 63. Ventral fin. |
| 22. Mesopterygoid. | 28. Articular. | | | | | |



Roccus lineatus. Face bones, shoulder and pelvic girdles, and hyoid arch

- | | | | | |
|-------------------|--------------------|---------------------|--------------------|-------------------|
| 17. Hyomandibular | 25. Opercle | 33. Interhyal | 50. Suborbital | 58. Hypocoracoid |
| 18. Symplectic | 26. Subopercle | 34. Epihyal | 51. Nasal | 60. Actinosts |
| 19. Quadrate | 27. Interopercle | 35. Ceratohyal | 52. Supratemporal | 61. Pectoral fin |
| 20. Pterygoid | 28. Articular | 36. Basihyal | 53. Post-temporal | 62. Pelvic girdle |
| 21. Palatine | 29. Angular | 37. Glossohyal | 54. Supracleithrum | 63. Ventral fin |
| 22. Mesopterygoid | 30. <u>Dentary</u> | 38. Urohyal | 55. Cleithrum | |
| 23. Metapterygoid | 31. Maxillary | 39. Brachioistegals | 56. Postcleithrum | |
| 24. Preopercle | 32. Premaxillary | 49. Preorbital | 57. Hypercoracoid | |

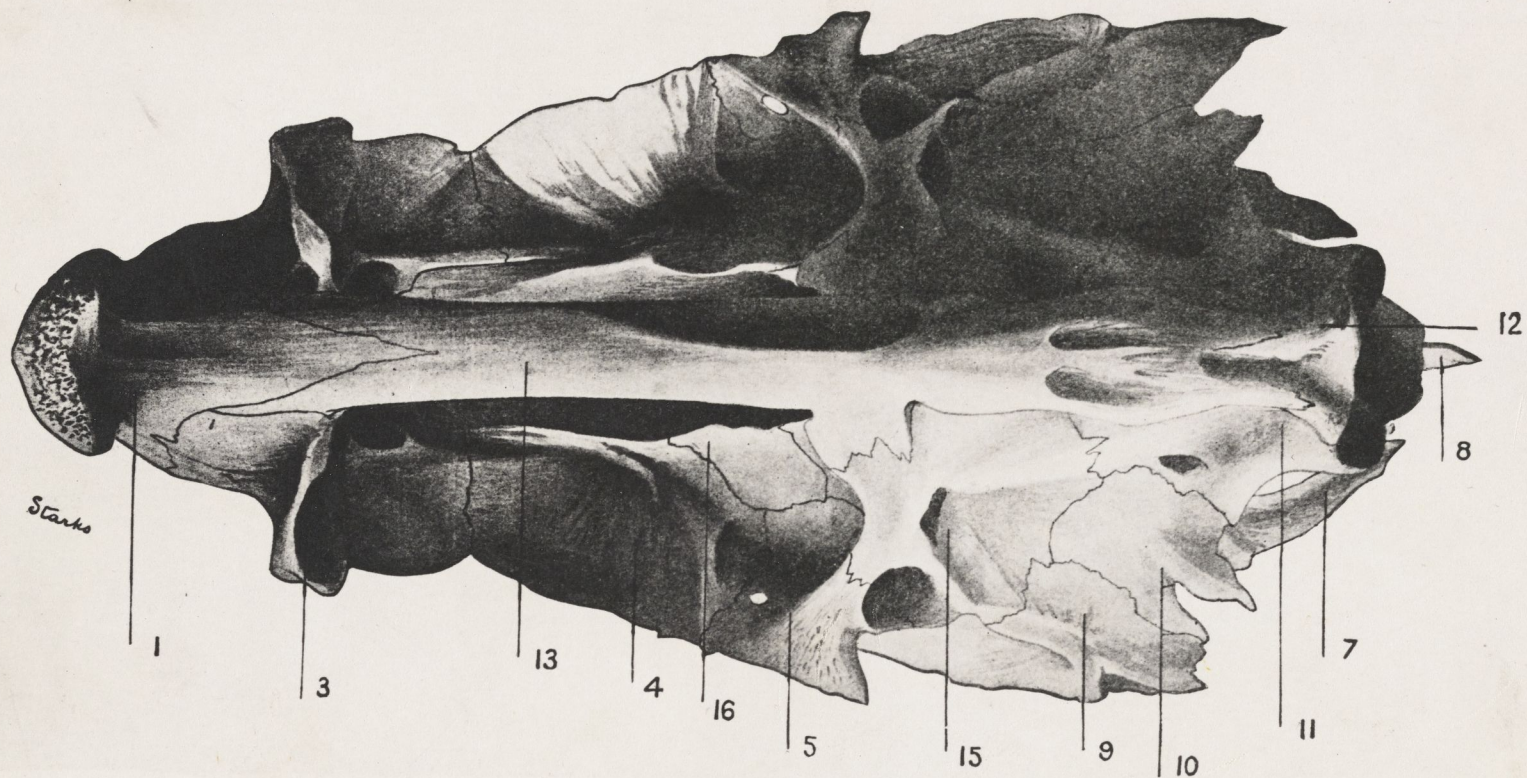


FIG. 24.—*Roccus lineatus*. Inferior view of cranium.

- | | | | | | | |
|------------------|-----------------|----------------------|-------------------|----------------------|---------------------|--------------------|
| ✓ 1. Vomer. | ✓ 4. Frontal. | ✓ 7. Epitotic. | ✓ 9. Pterotic. | ✓ 11. Exoccipital. | ✓ 13. Parasphenoid. | ✓ 16. Alisphenoid. |
| ✓ 3. Prefrontal. | ✓ 5. Sphenotic. | ✓ 8. Supraoccipital. | ✓ 10. Opisthotic. | ✓ 12. Basioccipital. | ✓ 15. Prootic. | |



—*Roccus lineatus*. Posterior view of cranium.

- | | | |
|--------------------|------------------|--------------------|
| 6. Parietal. | 9. Pterotic. | 12. Basioccipital. |
| 7. Epiotic. | 10. Opisthotic. | |
| 8. Supraoccipital. | 11. Exoccipital. | |

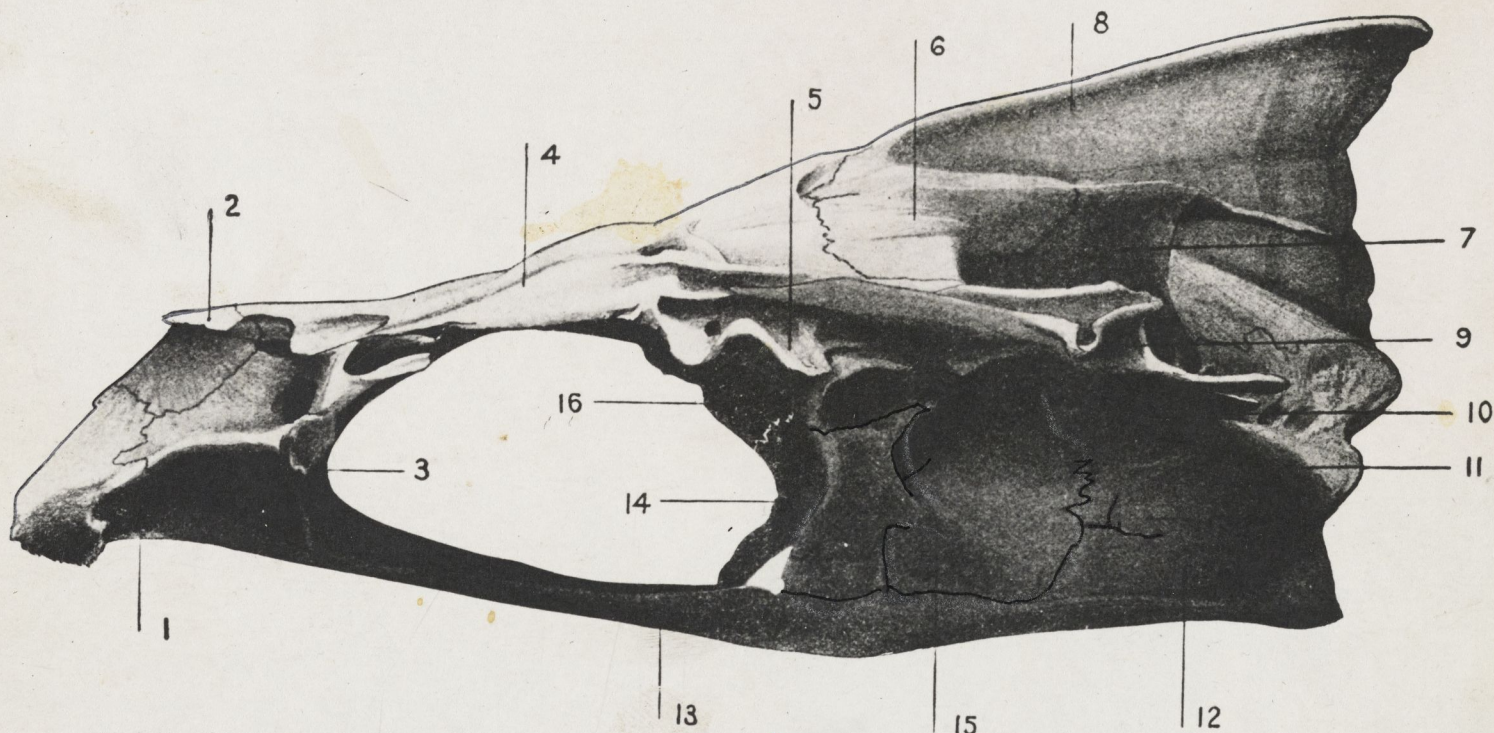


FIG. 22.—*Roccus lineatus*. Lateral view of cranium.

- | | | | | | | | |
|-------------|----------------|---------------|--------------------|-----------------|--------------------|-------------------|--------------|
| 1. Vomer. | 3. Prefrontal. | 5. Sphenotic. | 7. Epiotic. | 9. Pterotic. | 11. Exoccipital | 13. Parasphenoid. | 15. Prootic. |
| 2. Ethmoid. | 4. Frontal. | 6. Parietal. | 8. Supraoccipital. | 10. Opisthotic. | 12. Basioccipital. | 14. Basisphenoid. | |

16. ALISPHEOID
ORBITOSPHEOID