

# Scientific Illustration

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What is scientific illustration? "Scientific illustration is an art in the service of science," an art filled with complex information, craftsmanship, and a representation of the cooperation between artist and scientist. (Jastrzebski, 1985) Scientific illustrators work closely with scientists and the objects that they are researching. Scientific illustrators do not just illustrate organisms. They can illustrate geology, astronomy, textbook diagrams, etc. The Guild of Natural Science Illustrators defines scientific illustrations as accurate drawings or graphic images that allow the scientist and/or author to communicate their message. The illustrations should be able to convey the same message as the text that the author has written or has in mind (Hodges, 1989). Illustrators use their knowledge and skills to help scientists interpret their studies. There is a large amount of teamwork involved to help make their project a success, both scientifically and visually. They are used to help people visualize a situation in time, like an erupting volcano, new animals or plants, or even things that we may already know something about, like the California sea otter.

California Sea Otters (*Enhydra lutris nereis*) or the Southern Sea Otter are the local otters in the Monterey Bay. Male sea otters can grow to approximately 4.5 feet, including their 12-inch-long tail, and can weigh up to 85 pounds. (Snyderman, 1998) The females are smaller, with an approximate length of four feet long, and weight of 60 pounds. California sea otters are smaller than their northern cousins, the northern sea otter (*Enhydra lutris kenyoni*), that are found in Washington State, Canada, and Alaska. Southern sea otters can dive for about four minutes to depths of around 300 feet, but most commonly they dive to around 60 feet. Sea otters eat 20-25% of their body weight each day, using their paws and extra flaps of skin behind their forearms to hold food and tools while diving. Sea otters are true marine mammals (Paine, 1993). Because they spend most of their time in the water, feeding, playing, giving birth, or resting wrapped up in the kelp. Sea otters are members of the weasel family or Mustelidae (along with the river otters, minks, badgers, martens, weasels, wolverines, and skunks). Sea otters are also the most recently evolved marine mammal, and are usually found associated with kelp forests and rocky shores, but may also be found near sandy beaches or mudflats. (Deans, 1999b) River otters are one of their closest relatives, and are easily confused with sea otters. Northern river otters are smaller with long tails and slightly silvery fur on their undersides. River otters also live mainly in fresh water areas. (Whitaker, 1997)

Previous estimates of the worldwide sea otter population totaled between 150,000 to 300,000. The Coastal North American Indians, northern Aleuts, Russians and the Japanese hunted the sea otter for its warm fur. In the 1700's the sea otter population was near extinction because of widespread hunting (Riedman, 1997). Approximately 50 otters were discovered along the Big Sur coast in 1915. In 1911, four years prior to this discovery, sea otters were protected under the International Fur Seal Treaty. The state of California decided to protect them in 1913, ending the hunting on the local population once and for all. In 1938 the worldwide sea otter population may have been less than 2,000 sea otters. The southern sea otter population had been increasing steadily until the mid 1990s when their population began to decline again. Since 1995 the southern sea otter population has been decreasing. Their population totaled approximately 2,377 otters in 1995 and decreased to 2,090 in 1999. (U.S. Fish and Wildlife Service, 2000) Marks (1999b) states that their decline can be linked to a combination of factors. These factors include marine contaminants, starvation, diseases, and entrapment or entanglement in nets or traps used for fishing.

## References:

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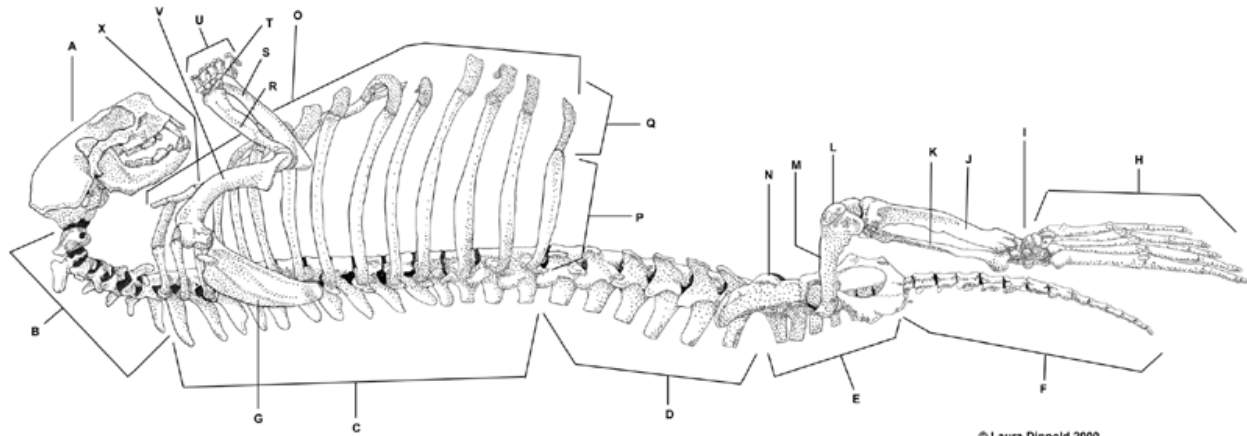


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# Sea Otter Skeleton



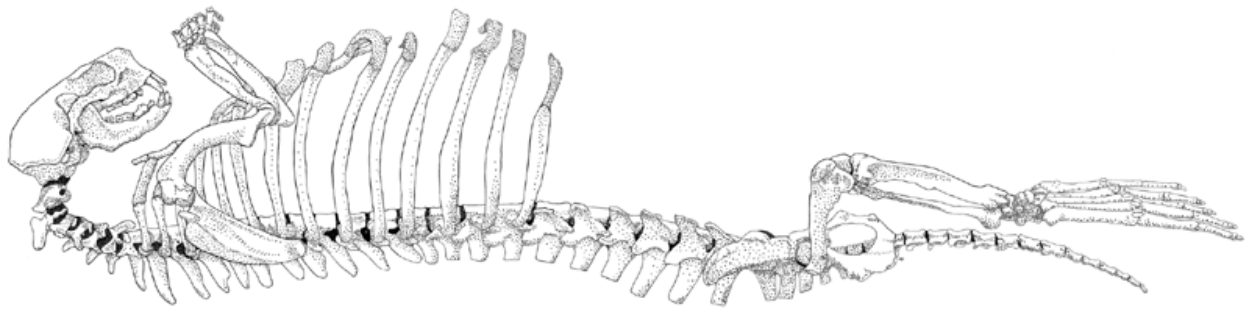
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## KEY:

Letter	Part
A .....	Skull
B .....	Cervical Vertebrae
C .....	Thoracic Vertebrae
D .....	Lumbar Vertebrae
E .....	Sacral Vertebrae
F .....	Caudal Vertebrae
G .....	Scapula
H .....	Ped (Foot)
I .....	Tarsus (Ankle)
J .....	Tibia
K .....	Fibula
L .....	Patella
M .....	Femur
N .....	Pelvis
O .....	Ribs
P .....	True Ribs
Q .....	Costal Ribs
R .....	Radius
S .....	Ulna
T .....	Carpus (Wrist)
U .....	Manis (Paw)
V .....	Humerus
X .....	Sternum

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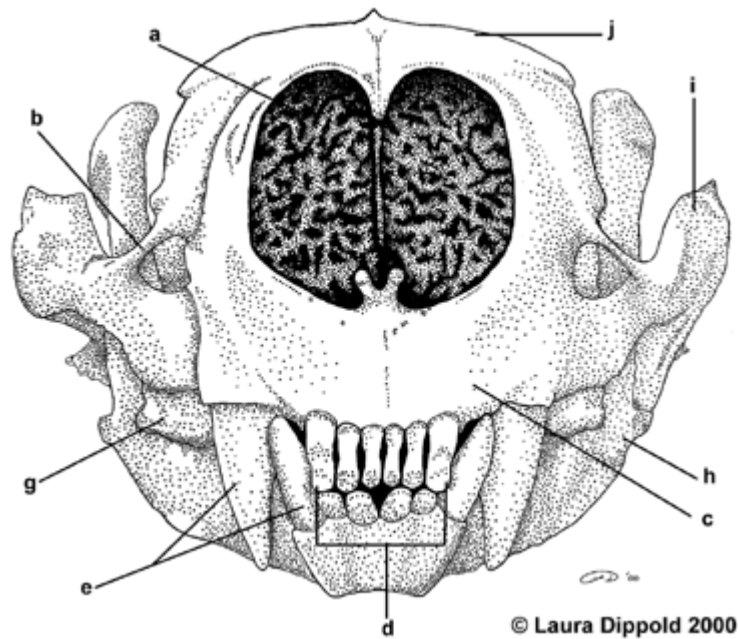
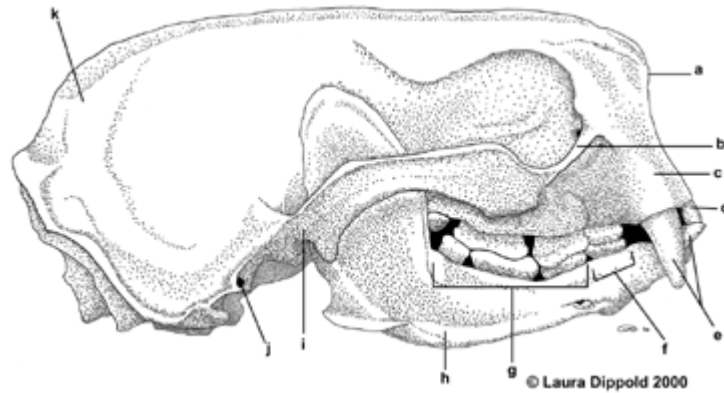


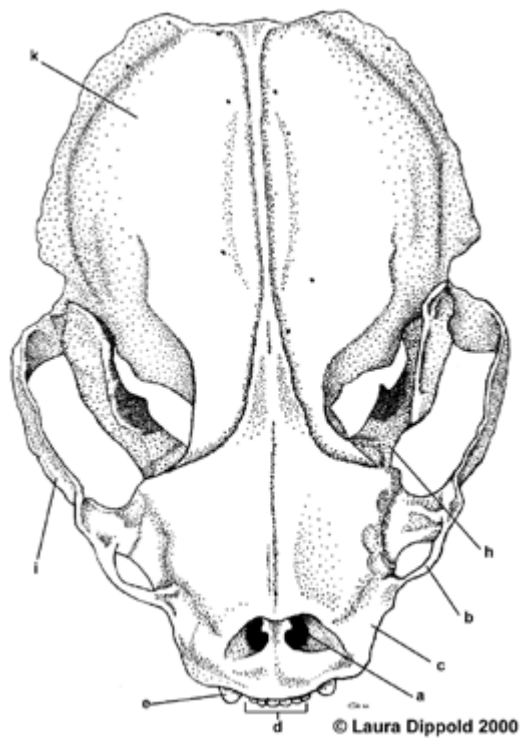
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# Sea Otter Skulls

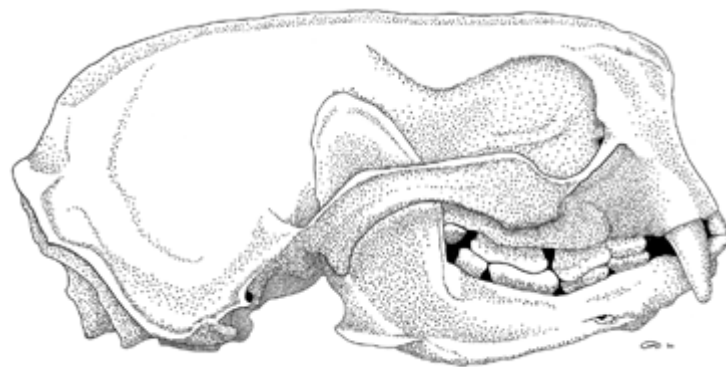




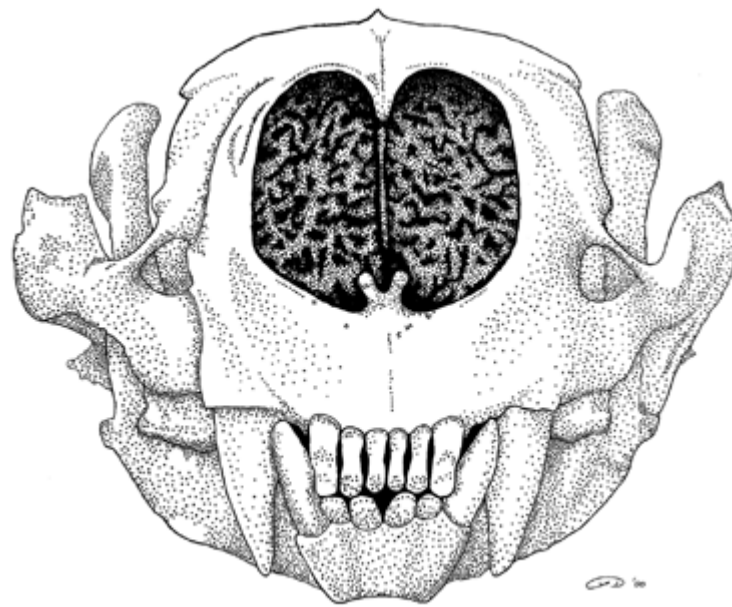
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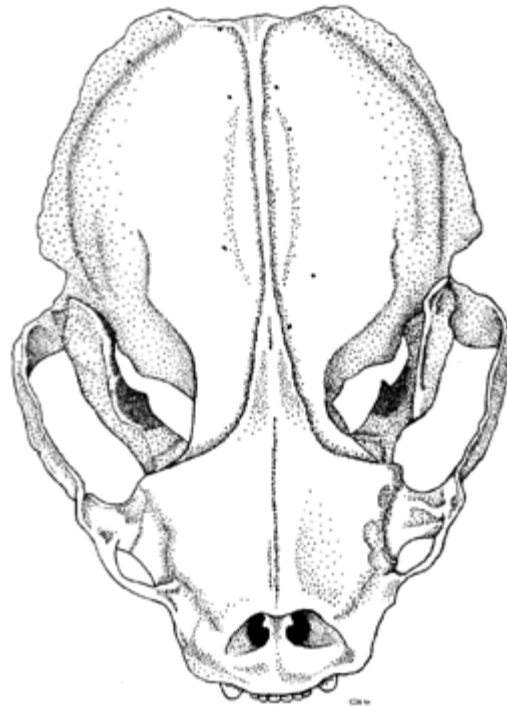
Letter	Part
a .....	Nasal Cavity
b .....	Orbit
c .....	Maxilla
d .....	Incisors
e .....	Canine
f .....	Premolars
g .....	Molars
h .....	Mandible
i .....	Zygomatic Arch
j .....	Acoustic Meatus (Ear)
k .....	Cranium



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