

# Green Sea Turtle

*Chelonia mydas*



[www.euroturtle.org](http://www.euroturtle.org)

## Picture

English - Green turtle

French - Tortue verte

Spanish - Tortuga verde



Green sea turtle hatchling  
illustration: M. Demma © ICRAM



Adult green sea turtle head  
illustration: M. Demma © ICRAM



Adult green sea turtle  
illustration: M. Demma © ICRAM

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## Size and Body Mass

N.B. All figures are from FAO (Food and Agriculture Organisation) unless otherwise stated.

Figures for females were assumed to be obtained during nesting.

SCL = Straight Carapace Length

CCL = Curved Carapace Length

Min. and Max. recorded sizes for adults:

**Min:** (at maturity) 78 cm (SCL?) Solomons.

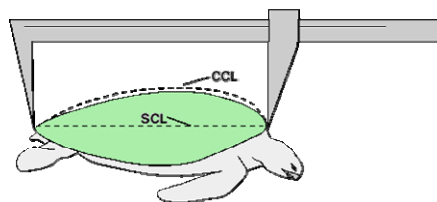
**Max:** 139.5 cm (CCL) Ascension Island.

n.b. CCL gives a figure which is approximately 3-4 cms longer than SCL.

World variation: (mean) figures, unless stated, are for mature females.

Surinam	112cm	Pritchard (1979)
Ascension Island	108cm	Carr and Hirth (1962)
Guyana	107cm	Pritchard (1979)
Aldabra	103cm	Frazier (1971)
Florida	101cm	Ehrhart (1979)
Costa Rica	100cm	Carr and Hirth (1962)
Yemmen	96cm	Hirth (1971)
Sarawak	95cm	Hendrickson (1958)
Turkey (Cukurova)	90cm	Geldiay & Koray (1982)
Turke (Mersin)	95cm	Baran, Durmas & Atatur (1988)
N. Cyprus	92cm	Broderick & Godley (1992-95)
Yemen	71-104 cm	(FAO) for males, which are generally smaller

Most figures taken from a paper by LM Ehrhart (1984?).



n.b. CCL gives a figure which is approximately 3-4 cms longer than SCL.

Overall body mass in Kg:

This varies considerably according to size, age and native population. In general the mass of a mature turtle ranges from 90 Kg to over 180 Kg

Australia	186 kg	FAO
Solomons	89.9 kg	FAO
Surinam	235 kg	FAO
West Indies	395 kg	FAO Claim from the 1960's ! (CCL - 150 cms)

West Indies figures are unconfirmed and unsexed

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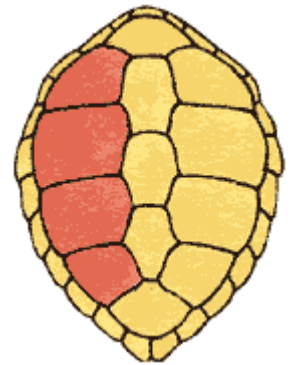
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## Diagnostic Features

- Carapace oval shaped in dorsal view, its width approximately 90% of its length.
- Head relatively short and blunt - approximately 20% of Carapace length
- Tomium of lower jaw has sharply serrated rim corresponding to strong ridges on the inner surface of the upper tomium.
- The carapacial scutes are thin, smooth and flexible when removed.
- Five central scutes, low keeled in juveniles, but lacking a median keel in adults and sub adults.
- Each flipper has one visible claw.
- Colour:



On the upper side, the colour can vary from pale to dark and from plain colour to vivid combinations of yellow, brown and green. These may form radiated stripes or a blotch effect.

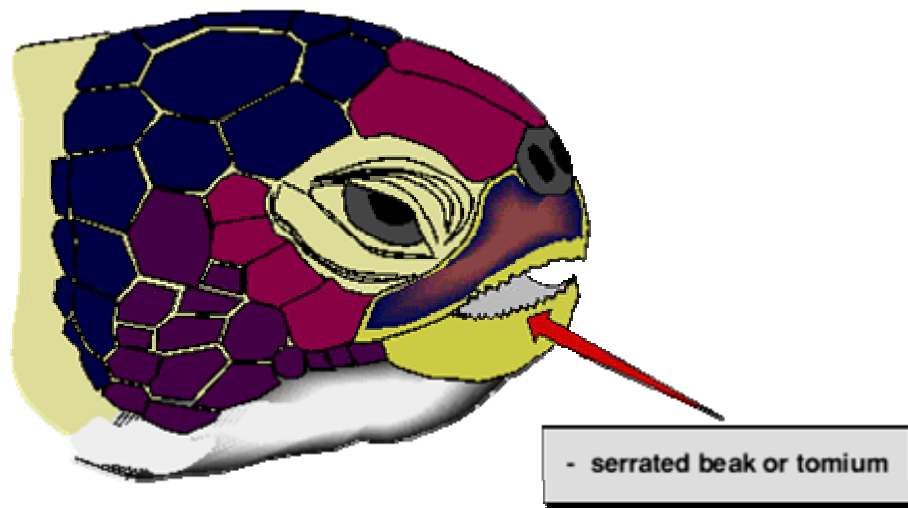
The Pacific populations (namely *Chelonia mydas japonica*) are more melanistic than the Atlantic ones (*Chelonia mydas mydas*) and easily confused with the [Black turtle](#) (*Chelonia agassizii*). Recent genetic studies by Bowen and Karl in Lutz & Musick suggest that *C.agassizii* is not a separate species to *C.Mydas*.

The underside in Atlantic forms is plain white through to a yellowish white. Pacific populations have a dark grey, blue or blue/green underside.

Juveniles have a yellow border to scales on the head and upper side of flippers.

Hatchlings are dark brown/black. The rear edges of the flippers and the rim of the carapace is white. Underneath they are white.

Green sea turtle carapace  
illustration: M. Demma  
© ICRAM



Head of *Chelonia mydas* - Green turtle showing serrated beak or tomium

The colours used are to aid identification, not actual colours

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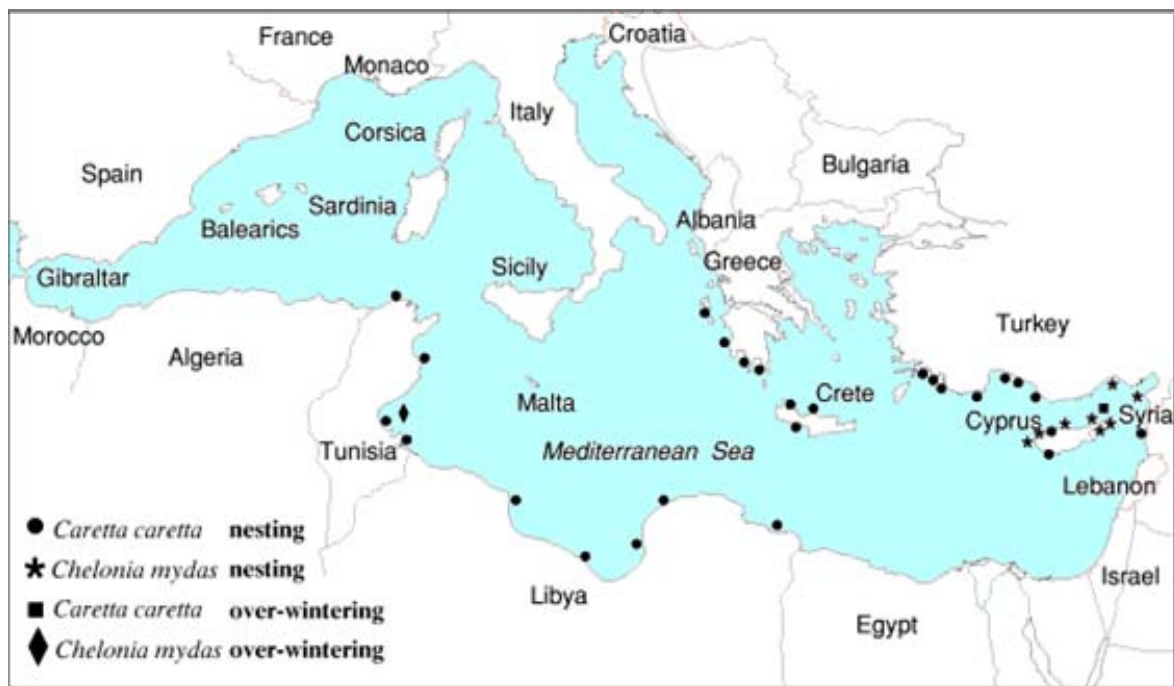
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## Geographical Distribution

- Widely distributed in tropical and subtropical waters, near continental coasts and around islands.
- Rare in temperate waters.
- The green turtle, together with the hawksbill, is the most tropical of all the marine turtles.
- Normal latitudinal range remains within the Northern and Southern limits of the 20°C isotherm.
- Range in Summer: Western Oceans: 40N 35S; Eastern Oceans: 30N 25S
- Range in Winter: Western Oceans: 30N 25S, Eastern Oceans: 20N 15S.
- Individuals do stray out of these limits but tend to be in a non reproductive phase.
- In the Mediterranean Sea, green Turtles are thought to spend most of their time in the Eastern end. They may have feeding areas on the coast of Tunisia.

The two nesting Mediterranean Species are included (Loggerhead and Green turtles).

**Please send an email to EuroTurtle if you can help update and correct any information shown.**



*Distribution map courtesy of MEDASSET*

- References used in distribution maps and population estimations.
  - Agardy, T., Last Voyage of the Ancient Mariner p30-37, BBC Wildlife December 1992,
  - Bjorndal, Karen A. (Editor), Biology and Conservation of Sea Turtles - (Smithsonian) 1995. (ISBN 1-56098-619-0)
  - The FAO Species , Catalogue Vol.11. Sea Turtles of the World, 1990. (ISBN 92-5-102891-5)
  - Lutz , P. L. and Musick, J. A., The Biology of Sea Turtles - (Marine Science Series )1996. (ISBN 0-8493-8422-2)
  - National Research Council, Decline of the Sea Turtles , 1990. (ISBN 1-900455-005)Proceedings of the 15th Annual Symposium on Sea Turtle Biology and Conservation, 1995.
  - Proceedings of the 18th Annual Symposium on Sea Turtle Biology and Conservation, 1998.
  - Ripples, Jeff Sea Turtles: (World Life Library) 1996. (ISBN 0-309-04247-X)

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## Habitat and Biology



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### Typical habitats:

- Found in warm sea water on both continental and island coasts.
- Typically a solitary animal, it does occasionally form feeding aggregations in shallow water areas where sea grass and algae are plentiful. Some feeding areas support an entire population, others are seen only to contain turtles of a certain age.
- Nesting sites are always found in places with a sea water temperature of over 25°C.

### Migrations:

- The Green Turtle migrates from rookeries to feeding grounds, which can be several thousand kilometres away. These migrations are usually carried out along the coast, but in the case of some populations, e.g. that of Ascension island, the turtles undertake a transoceanic migration of over 2200 Kilometres from their nesting beaches on the island to their feeding grounds in Brazil (the means of navigation remains a mystery). The exact nature of migrations of the hatchlings and juveniles are unknown. It is known that they converge in the open ocean after hatching and leave the pelagic habitat for the benthic feeding grounds only when the carapace is 20-25cm long. What happens in the interlude is unknown. The population of green Turtles in the Mediterranean is thought to be isolated from other populations. There is evidence to show that turtles enter and exit the Mediterranean, but it is thought that this is due to navigational error.

### Nesting areas:

- The Mediterranean population of Green Turtles is very small compared to those in other parts of the world.
- In the Mediterranean, the main nesting sites are in South Eastern Turkey and Cyprus.
- 339–360 female green turtles are estimated to nest annually in the region. These population estimates are likely to be optimistic (Broderick *et al*, 2002).
- Generally, the green turtle nests within the tropical latitudes, on gently shelving sandy beaches protected from the sea.

### Nesting periods:

- This usually occurs in Spring or Summer. Times vary slightly depending on exact location of nesting beach.

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Caribbean: April to October  
Gulf of Mexico: May to September  
NW Atlantic Ocean: May to October  
SW Atlantic Ocean: Throughout the year  
SE Atlantic Ocean: November to February  
Western Indian Ocean: Throughout the year

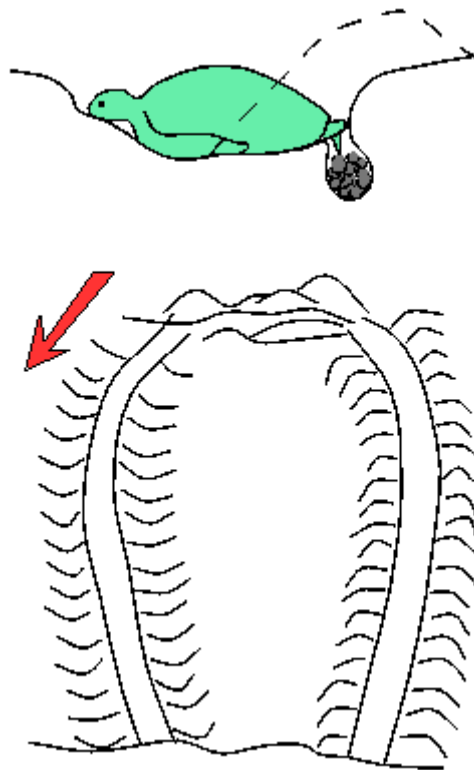
NW Indian Ocean: May to October  
Central Indian Ocean: July to March  
Eastern Indian Ocean: May to November  
Western Pacific Ocean: Throughout the year  
Central Pacific Ocean: Throughout the year  
Mediterranean Sea: May to September



illustration: M. Demma © ICRAM

## Nesting behaviour:

- Females usually show nesting site fixity, often returning near to the spot that the last clutch was laid, perhaps even where they emerged as hatchlings. The female comes ashore at night on a gently sloping sandy beach. The site of the nest is always well above the high tide mark. A flask like pit is dug and the clutch of eggs deposited in it. The nest is then camouflaged with a covering of sand. The turtle then returns to the sea. A picture of the tracks left by a Green Turtle is shown below.



## Clutch size, egg size and weight:

- Most females will lay between two and five clutches each breeding year, with the mean being slightly over 2.5 times. On average the time between each clutch being laid is two weeks. This varies with the population. Females usually have an interval of two years between successive

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breeding years. However, this varies, and they can lay every year or every four years. This is thought to vary depending upon diet and nutrition.

- The number of eggs per clutch varies greatly from population to population. Clutch size depends on weight, age and size of the turtle, distance of migration, and time of season.

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	egg number/clutch	
	Minimum clutch	Maximum clutch
South Yemen	38	-
Ascension Island	-	195
Mediterranean	33	190
Cyprus	mean clutch - 115.5 (n=347) Broderick & Godley (1996)	

The weight and size of the eggs varies from population to population.

	Minimum size(mm)	Maximum size(mm)
South Yemen	42.3	-
Ascension Island	-	54.6

	Minimum weight(g)	Maximum weight(g)
SE Africa	47.7	-
Comoro Islands	-	52.9

## Incubation period:

- Incubation period varies from 48 to 70 days in length. This depends on humidity and temperature change during the season. The cooler the weather, the longer the incubation time.
- In Cyprus the mean incubation period (1995) was 51.1 days (N = 121)

Broderick & Godley (1996)



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## Size and weight of Hatchlings:

	Hatchlings	
	min. weight (g)	max weight (g)
<b>SE Africa</b>	18.4	-
<b>Hawaii</b>	-	35
<b>Comoro Island</b>	21.6	-
	min. size (mm)	max. size (mm)
<b>Yemen</b>	44	-
<b>NE Australia</b>	-	54

The resultant size and weight of the hatchlings depends on the size of the egg.

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## Maturity:

- Recent estimates point to the age of sexual maturity to be between 25 to 30 years or more. These figures take into account average populations of nesting turtles, not just maxima and minima. In captivity, sea turtles on a high protein diet can reach sexual maturity in as little as 10 years.

## Courtship and Mating:

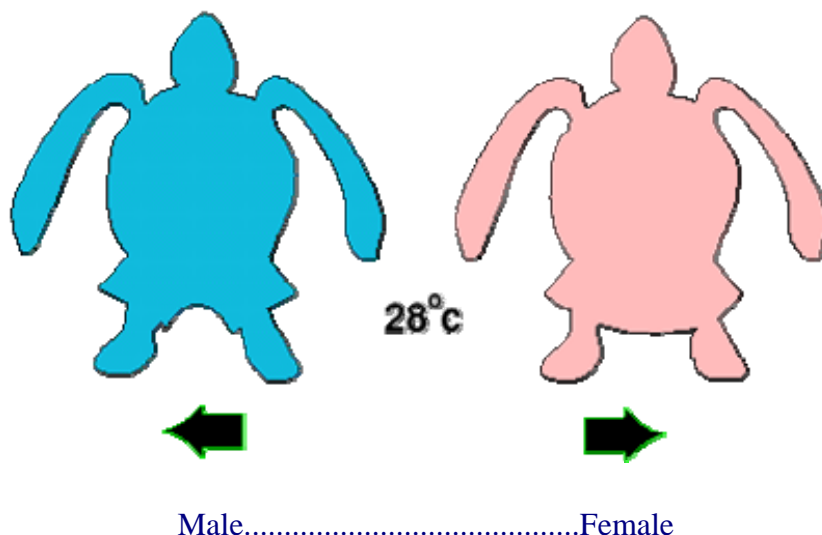


illustration: M. Demma ©  
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- This occurs at sea near the nesting beaches. A single female can be courted by several males. Copulation starts early in the mating season and usually stops when nesting begins. A female will not usually mate once she has laid her first clutch. It has been hypothesised that the fertilisation of the eggs laid in any one season may have taken place several years before, and that sperm may also be stored and used for clutches in the next season.

## Sex determination:

- The sex of the turtle is temperature dependant. The pivotal temperature of any location is specific to that population. In the Mediterranean, the pivotal temperature is 28°C (Mrosovsky et al. 1984). If the average temperature is greater than this then the more hatchlings will be female than male; if the average temperature is lower than this, then more of the hatchlings will be male than female.



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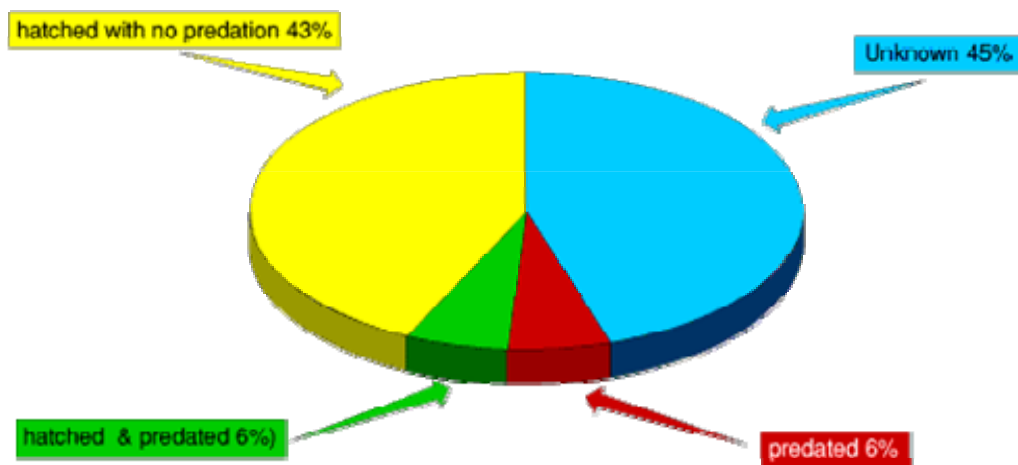
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## Hatching:

- The hatchlings from one nest emerge together at night and race toward the lightest part of the horizon: the sea. The hatchlings move quickly down the beach and swim to open sea. It is believed that it is during the "race" to the sea that the hatchlings become imprinted and then return to that same (natal) beach in future years.
- In Cyprus the mean hatching success rate (1995) was 84.2% (N = 341) Broderick & Godley (1996)

## Hatchling mortality and predation:

- There is a high level of predation throughout the life cycle of the green turtle. Only when it reaches a size that is large enough to avoid being swallowed does it cease being preyed upon by all but sharks. Before the hatchlings emerge, they are often eaten by small mammals, such as racoons, mongooses, dogs or jaguars, or by other animals, such as monitor lizards, ghost crabs, ants, or fly maggots. Nests can be killed off by bacterial infection or by fungi. Nests are also lost due to erosion and damage due to bad weather.
- In the Mediterranean, the main predators of eggs are foxes, crows and other day diurnal birds scavenge eggs from disrupted nests. When the hatchlings emerge, they are very vulnerable and are preyed upon by birds and fish. The main predators of hatchlings in the Mediterranean are ghost crabs and large pelagic fish such as *Coryphaena hippurus*. Crows and other birds will feed off any hatchlings which are on the beach in the daytime.
- Sharks are the biggest predators to mature green turtles throughout the world, however dolphin fish and groupers prey upon even medium sized juvenile turtles.



The fate of green turtle nests - figures from Glasgow University Expedition to Northern Cyprus 1995

Broderick & Godley (1995)

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## Commensals and disease:

- Unlike loggerhead turtles, the green turtle has very few commensals. Little is known about specific diseases suffered by this species. However, at sea, invertebrates such as leaches (*Ozobranchius branchiatus* and *Ozobranchius marggoi*), invade the epithelial areas of the body, especially near to the cloacal opening, eyes, axils, etc. causing necrosis, and it is reported that heavy infestations produce a kind of papillomatosis.
- Since 1989, the incidence of green turtle disease (first observed over 50 years ago) - fibropapillomatosis - has sharply increased and now poses a real threat to the survival of many green turtle populations ( Barrett - Endangered Species Bulletin Vol.XXI No.2). There is a suggested link between the disease and an increase in contaminants but this has yet to be proven. In Hawaii, 49-92% of turtles captured have the disease. The cause of the disease is unknown but a viral infection is suspected. The disease is characterised by one or more non-cancerous fibrous tumours commonly located on areas of soft skin. The disease may cause an increased susceptibility to parasites, obstruct swimming and feeding, disorientate, impair vision and in some cases, even prove fatal. The disease also occurs in other species of sea turtle.

## Feeding:



Seagrass

illustration: M. Demma ©  
ICRAM

- Mature green turtles feed during the day time in the sea grass beds that grow in shallow waters. They graze these sea grasses, such as *Zoostera*, *Thalassia* and *Vadalia*, which are then digested with the aid of micro-organisms in a special part of the turtle's intestine. Juvenile green turtles and hatchlings are omnivorous. It is thought that this allows them to grow faster as they have a higher protein intake. The serrated jaw or tomium allows for efficient grazing of sea grasses.

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## Threats to Survival

Although the green turtle has a large world-wide population compared to many other species of turtle, its survival is still threatened. Causes are:



**Loss of habitat due to coastal development, including tourism and industrialisation**



**Accidental capture by fishing activities**



**Pollution** due to industrial waste, marine debris etc



**Collision with motorboats**



**Photopollution**



**Human predation (egg collecting, meat consumption, carapace exploitation)**



**Animal predation**

Illustrations: M. Demma © ICRAM

### Human predation:

- Due to egg collecting which are used as an aphrodisiac in many countries and sell for high price. Thousands of eggs taken from nests each year.
- Meat eating: regarded as the most palatable of all the turtle meat, hundreds of wild Green Turtles are killed each year for their flesh and manufacture of *turtle soup*. Modern turtle "ranching" has possibly reduced this number.
- Turtle-shell: by product of killing for flesh, but low demand.