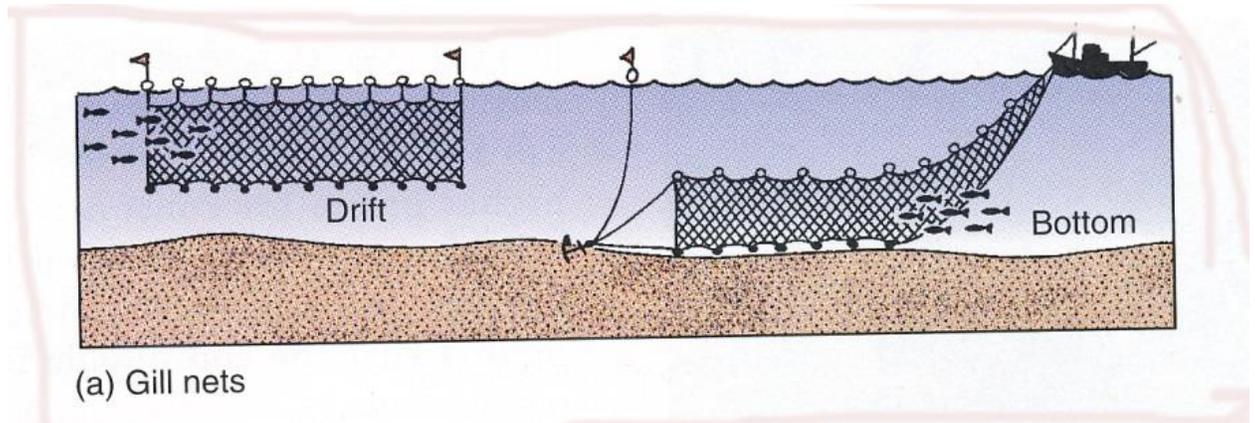


Massive fish catches today are quite different from the numbers of fish caught with nets that are pulled by hand



More recently a number of techniques have been used for catching large numbers of fish. These are:

Gill nets



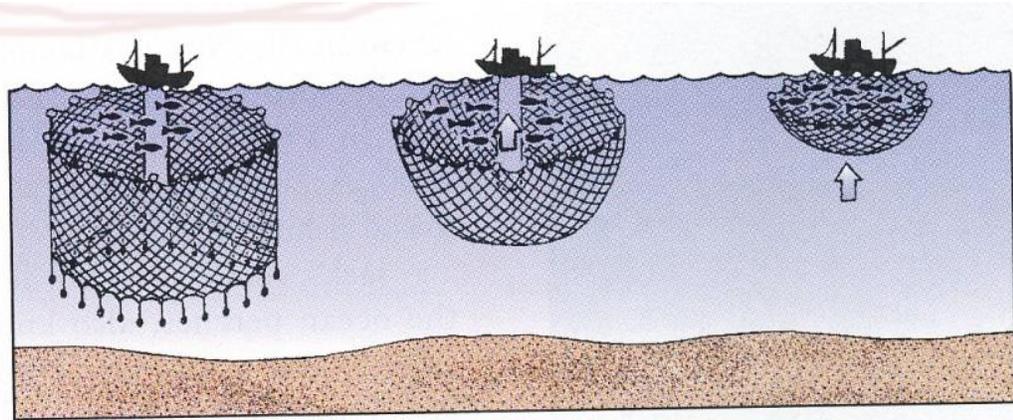
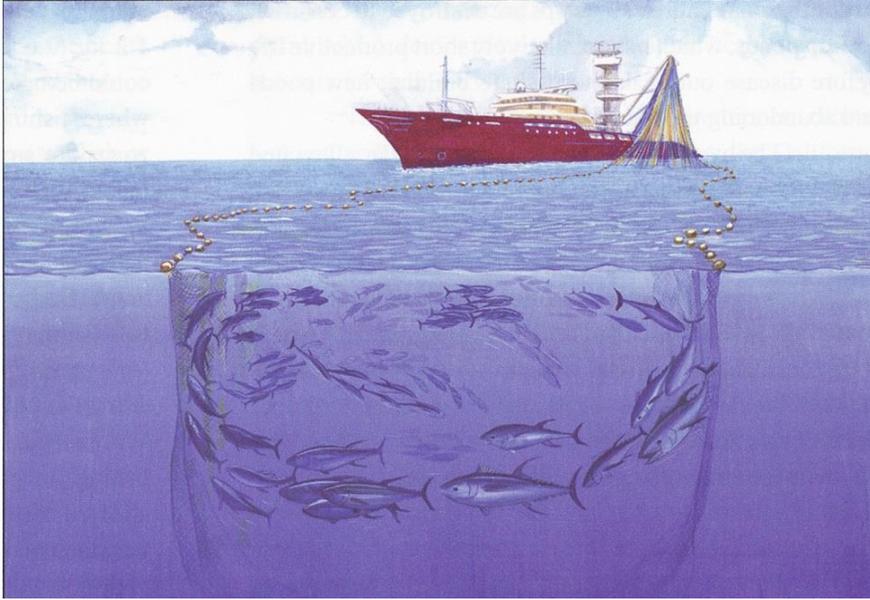
(a) Gill nets

Gill nets are not restricted to commercial fishing. They date well back to antiquity. The nets can be made with different size openings. The larger the opening, the larger the fish that is caught (that is smaller fish can swim through larger ones cannot).

Currently the size of the openings and the strength of the netting are heavily regulated. This is done to prevent some "over fishing" (taking too many of the same kind of fish) and trying to avoid catching many kinds of fish which may not be what is wanted (by catch)

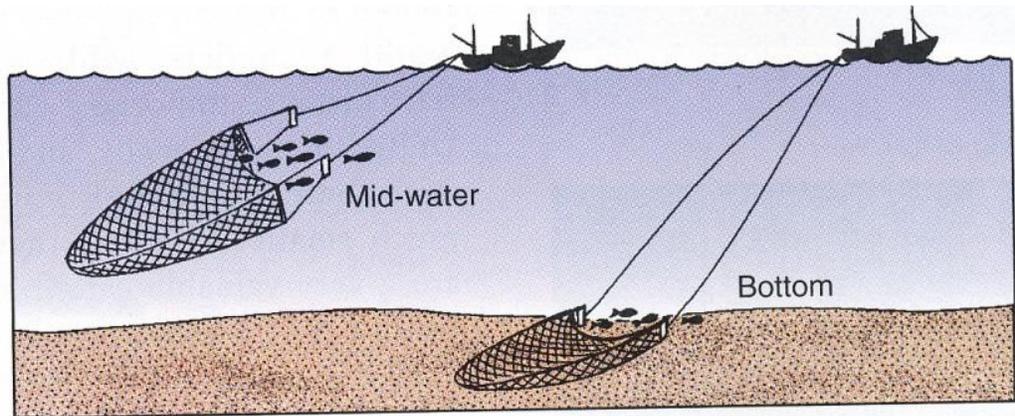
Some materials used in making nets is resistant to decay, and such equipment when it breaks loose, continue to "fish" even though there are no people to catch the fish and use them for food. This catching of fish by fishing equipment that has broken loose is known as "ghost fishing"

Purse seine



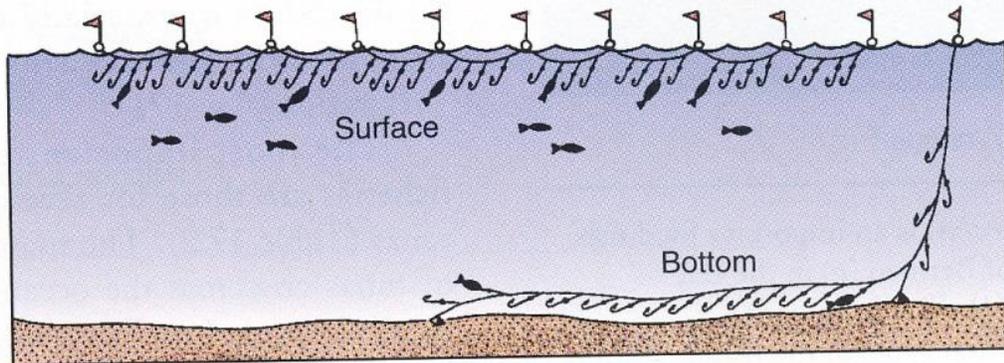
(b) Purse seine

Trawls



(c) Trawls

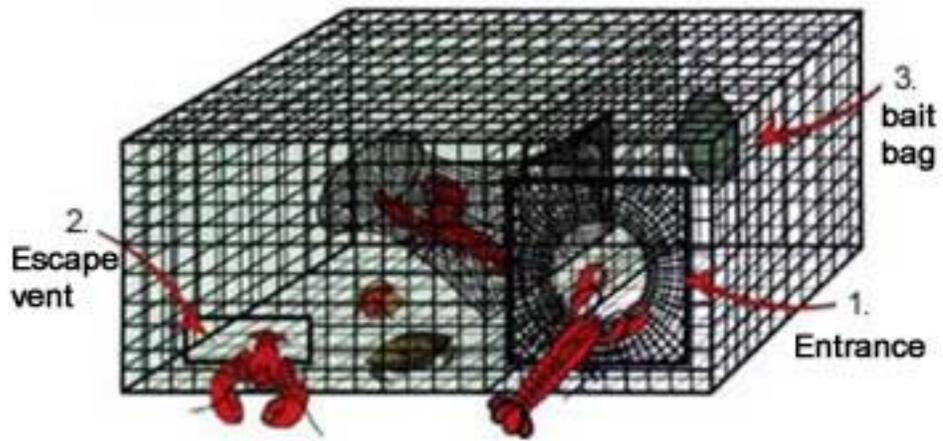
Long line



(d) Longline

NON FISHING FISHING – i.e crabbing, lobstering clamming etc

These are ways of gathering sea food with methods other than fish lines, hooks and so on





SOME PROBLEMS WITH FISHING

Who owns the oceans????

There are a number of problems with fishing in the ocean since the oceans are "free". But with a 200 mile limit now in use, more fish fall within the different countries' borders and foreign vessels may try to fish there despite the laws.

In America, there were a number of problems with Russian ships trawling in American waters and destroying the ocean bottom, thereby upsetting the habitats of much marine life.

Maximum sustainable yield:

The greatest catch of a species that will ensure the long term viability of the species.

Recruitment overfishing:

Recruitment overfishing occurs when the mature adult population (spawning biomass) is depleted to a level where it no longer has the reproductive capacity to replenish itself—there are not enough adults to produce offspring. Studies show that within 15 years of a new fishery opening about 80% of the largest fish are taken.

Growth overfishing:

Growth overfishing occurs when fish are taken too small, before the fish have grown to a size that produce the maximum yield. This reduces the value of the catch since if the fish were to grow, the individual fish would weigh more and bring a higher price in the market.

Overfishing occurs when many fishermen become attracted to the same new fishing industry. As a result many people move in to take the fish. The numbers start to decline. Best option: stop fishing for that fish. Does it happen? No.

Do fishermen understand these problems?

Yes, but they have families to feed and bills to pay. Often they have taken out loans for boats and equipment.

Among the problems found with these techniques is the problem of "BYCATCH". Large fishing vessels generally go after one or two types of fish, but other kinds of fish get caught in the nets. These fish are known as "bycatch" and are often die on board and are dumped back into the ocean.

While originally it was thought that the ocean had in exhaustible supply of food, it appears this is not the case. Fish supplies have been dwindling and several species have become extinct or reached near extinction levels of population.

There is a possibility that some of these “near extinction” populations may rebound. The California Gray whale which was on the endangered species list has been removed from the list. The North Atlantic Right Whale has a very debatable future and while there are many regulations in effect concerning the whale (how close one can come to one of them and restricting the speed of boats in the areas where they are found), there are some who feel that the species may not recover. Among the factors affecting recovery are:

Some of the industries dealing with taking marine life that have already collapsed are:



Anchovies in Peru



Blue whale – world wide



Cod fish – New England



Blue crab – Chesapeake Bay



North Atlantic Right Whale

Cascading problems

The loss of a single species (or severe reduction in the numbers) can have devastating effects on other species who feed on them

For example:

Pollack and mackerel were overfished in the North Pacific. These are the favorite food for seals and Steller sea lions. . With the loss of the Pollack and mackerel, the seals and Steller sea lions died off. These mammals are the favorite food of Killer Whales (Orca), so they switched to eating sea otters (an animal already endangered. The sea otters eat sea urchins whose favorite food is kelp. If left uncontrolled, the sea urchins will eat the kelp beds away. The kelp beds are breeding grounds and nurseries to many animals. This is what happened – as the sea otter population dropped, the sea urchin population increased and the kelp beds were destroyed.

The fact that the industry has collapsed doesn't mean the species is extinct. It means that the numbers have dropped too low to make it worthwhile to go after those animals any more. (Remember though the by-catch problems).

Questions that need to be answered about determining whether or not the stock will or will not go extinct,.

1. How small has the stock become? Number of animals remaining
2. What is the age of maturation?

3. How long is the time from fertilization to birth (Gestation periods)?
4. How many offspring are there from a single mother?
5. How many times does the organism produce offspring i.e. what is the death rate relative to number of times animal mates? (salmon die after spawning)
6. What is the survival rate of offspring?
7. What factors impact mating choices?
8. What other factors affect the mating and embryology? (changes in temperature, salinity, etc. Frog eggs produce more females than males as temperature rises).
9. Consider sex ratios. # of females is more important than the # of males in terms of reproduction numbers. With humans, 1 man with 10 women can yield 10 children per year. 10 men with 1 woman can yield 1 child per year (this is why wars do not significantly impact the growth of populations in most cases since there were more male soldiers and so populations after the war were skewed in terms of more women than men. By the next generation that skewing was basically gone.

How does this affect your ideas about things like the Loch Ness monster?

1. How large a breeding population would you need to keep it going?
2. How many are there? How many different "Nessies" have been seen?
3. How long have there been reports of the "monster"?
4. Are there answers to the first three questions asked about breeding population of "Nessies" in the Loch? What does that tell you?

CULTURE

Cultures are often divided into 2 parts – the areas dealing with technology (which we have been discussing); social structure – everything from the family up to complex governments; and symbolic aspects – religion, ethics, belief systems folklore and so on.

In the early days of anthropology the anthropologists were very involved with evolution – it was the "spirit of the times". Lyell had postulated geological evolution, Darwin biological evolution and early social scientists were talking about the evolution of societies. Remember our earlier discussion about this in technology. Some of that is apparent in the

false cause and effect (if I plant this stone in my garden the crop will grow better). The intermediary step was religion.

The argument was made that “in the beginning” people saw cause and effect, but it was a false cause and effect. After a while, they determined that they couldn’t control what happened and then decided that the universe was under the control of some supernatural beings and all one could do was to try to get them to help. Magic was “manipulative” Do x and y follows. Religion was supplicative – You had to get the gods or spirits to help.

Finally people realized there is true cause and effect and that was science and so the universe could be “manipulated”. So the evolutionary system postulated a move from magic to religion to science.

Science (Manipulation)
|
Religion (Supplication)
|
Magic (Manipulation)

The argument went that people discovered they did the required magical bits and nothing happened. They realized magic didn’t work so they gave it up. Then they discovered that religion, in the form of prayer or supplication didn’t work and they gave that up.

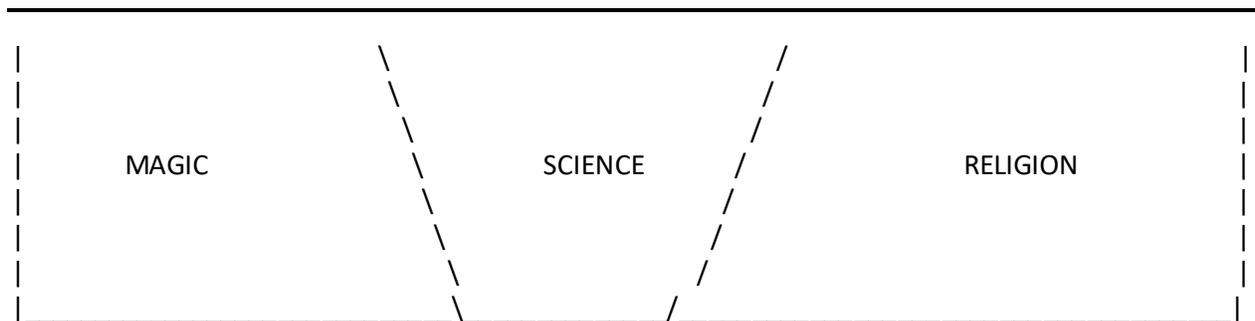
Then they went to science.

However, it was pretty clear that people who practiced magic and the magic didn’t work had ready explanations. “I did something wrong”. “Someone who had greater magic than I worked against me”. So why give it up?

Why would people give up prayer because their prayers went unanswered? Billy Graham (the evangelists and not the professional wrestler) said “There are no unanswered prayers. It’s just sometimes the answer is “no”. If, as happened in European based societies, you found magical practices and religious practices, these were viewed as “survivals” from an earlier age.

Bronislaw Malinowski, a Polish anthropologist who was living in London, decided the situation was wrong. He claimed that there were no societies found by reputable investigators that didn’t have all three. He saw the

division as being one of the world of the "sacred" which contained "magic" and "religion" and the world of the "profane" which contained "science".



Each culture has some of each but in different ratios of proportions. In the west, it would appear that science and religion are on something of a collision course since both are "explanatory". In other cultures this is not the case. For example, although Japan has both religion and science and both talk about the creation of the world, one is seen as a "symbolic" explanation the other as a physical explanation and one has nothing to do with the other, so the conflicts between the two common in the west are missing in Japan.

We can even see that there are serious differences between religion in Europe and the United States in their dealing with religion. Some analysts point to the strong fundamentalist base in the US as a result of the constitutional separation of church and state which did not occur in Europe. Europe had "national" religions "The Church of England", "The Church of Scotland" and so on. To practice a variation in the religion was not only heresy, but probably traitorous. In the US without a "national religion" fundamentalism and many, many variations developed. So you can see how historical developments can begin to impact on different cultures in different ways.

One of the questions that has been raised about magic has to do with how it works and when it is used. (One can also question moves from the profane to the sacred. Pellegrino Luciano points out that in Italy people seek medical advice for some illness. When that fails, there is a move to the sacred and

people take part in processions and look for interventions from saints and so on. The move is also from "private" medical consultations to "sacred" more public statements that tend to make one's position more likely to attract a kind of support network.

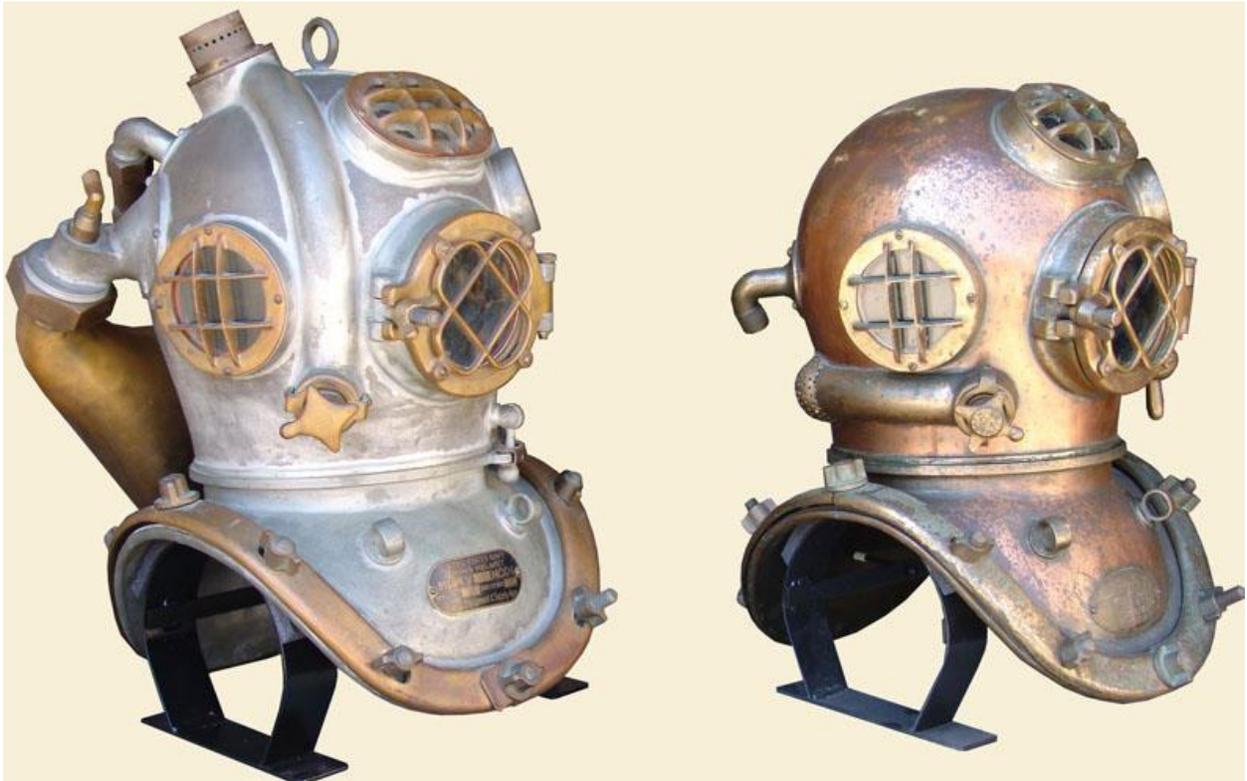
Magic is often seen as a kind of "last resort" or something to do when there is a great deal of risk that cannot be controlled. Gmelch, an anthropologist and professional baseball player, pointed out that in baseball, some players do magical acts (rituals) while others do not (these acts are sometimes called "superstitions") He points out that several positions on the baseball team are "high risk" whereas others are "low risk". Pitchers are high risk. There are many factors that impact on whether the pitcher does well or not. Outfielders just have to catch the ball and throw it. He then points out that the pitchers are the ones who want to wear the same socks they wore when they pitched a winning game, or come to the locker room at the same time as the last game the one. Outfielders seem oblivious to such things. Magic is something which occurs then when risk is high, and when there seems nothing else left to do.

Since being on the ocean is a high risk situation, one might suspect that as societies become more technological, the perceived risk begins to drop and the amount of magic practices begin to drop off as well. Japanese commercial fishermen told me "It was bad luck not to show up on pay day!" They did know of some other statements that had been made about things one should not do on board a ship. For example, one should not pour soup over rice.

This is a kind of "sympathetic" magic where like produces like. Liquid (soup) going over something more solid (rice) can be seen as paralleling the ocean swamping the boat. Among American sailors on square rigged ships, whistling on board is considered bad. Whistling is made by a strong breath coming through the mouth. This parallels strong winds (storm winds) which are very dangerous to any ship.

Commercial divers using diving helmets known as Mark 5 used to tie a "carrick bend" – a bend is a way to fasten two lines together – through the loops in the diving helmets when they were hung up. (In this case, the "two lines" are actually the two ends of the one line). Other divers would refuse to use a helmet that didn't have this tie in the line. Deep sea or commercial diving is a risky business since divers are dependent on people on board the

ship (tenders) to tend to their air hoses and other lines. In addition, being on the bottom of the ocean wearing gear guaranteed to hold you under is not exactly something helpful if no one is there to pull you up!





Many of the ships in different parts of the world are decorated or given names to assure safety. Most Japanese boats are called something or other MARU – the word for “circle”. Nippon Maru (Japan Circle). The idea of the circle here represent a complete voyage. The ship goes out and then returns and makes a complete circle so in fact it has come home safely again.



Many boats are decorated with images designed to protect the vessel from harm in the ocean. Some of these include “figureheads” and others paintings

or carvings. Other times, the figureheads are related to the name or the company owning the vessel.

On the NW Coast of North America, native peoples built huge canoes that were decorated often with clan animals.





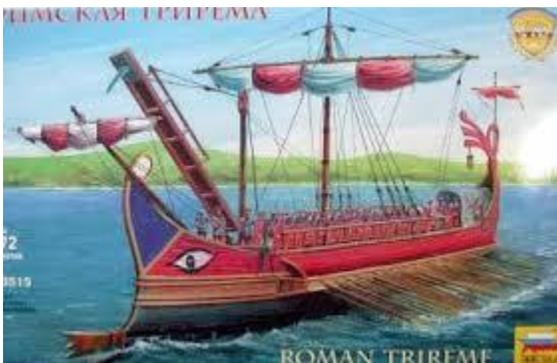
https://www.youtube.com/watch?v=Ysb8_iQpggI



VIDEO AT https://www.youtube.com/watch?v=Ysb8_iQgpgI

Ancient Egyptians used birds (possibly since they roost on land)

Phoenicians used horses as figureheads most likely to indicate (or hope for) speed some had "eyes" to watch for problems and directions



Greeks: Boars heads – ferocity, good vision

Romans: Centurions in battle

N. Europe: dragons, serpents, bulls, dolphins, and later swans for grace and mobility



Germany, Belgium small creatures lived in the figurehead which guarded against evil things like storms. If the ship sank, the spirits led the drowned sailor's souls to the land of the dead. Without such guides they would remain forever at sea.

Some figureheads represent sea creatures:



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Women on figureheads may have been divinities or were thought to have a calming influence on the ocean







Anything which could be potentially linked to causing increased danger would be of concern. This is the "cause and effect" bit with magic.

In religion, probably the most famous story is that called "Jonah and the Whale" which occurs in the book of Jonah in the Old Testament.



One can in fact quibble over the word used in the story for the animal which is sometimes called "a great fish" and sometimes called "a whale". For many cultures, whales and fish are lumped together under a term loosely translated as "fish" which appears to mean some sort of vertebrate water living sea animal. Sakana for example in Japanese is often used for "fish" although there is another word "uo" that means "fish" (same character 魚) means something to have with Saki and can be either fish or whale meat.

The plot centers on a conflict between Jonah and God. God calls Jonah to proclaim judgment to Nineveh, but Jonah resists and attempts to flee. He goes to Joppa and boards a ship bound for Tarshish. God calls up a great storm at sea, and, at Jonah's insistence, the ship's crew reluctantly cast Jonah overboard in an attempt to appease God. A great sea creature, sent by God, swallows Jonah. For three days and three nights Jonah languishes inside the fish's belly. He says a prayer in which he repents for his disobedience and thanks God for His mercy. God speaks to the fish, which vomits out Jonah safely on dry land.

1:1 Now the word of the LORD came unto Jonah the son of Amittai, saying,

1:2 Arise, go to Nineveh, that great city, and cry against it; for their wickedness is come up before me.

1:3 But Jonah rose up to flee unto Tarshish from the presence of the LORD, and went down to Joppa; and he found a ship going to Tarshish: so he paid the fare thereof, and went down into it, to go with them unto Tarshish from the presence of the LORD.

1:4 But the LORD sent out a great wind into the sea, and there was a mighty tempest in the sea, so that the ship was like to be broken.

1:5 Then the mariners were afraid, and cried every man unto his god, and cast forth the wares that were in the ship into the sea, to lighten it of them. But Jonah was gone down into the sides of the ship; and he lay, and was fast asleep.

1:6 So the shipmaster came to him, and said unto him, What meanest thou, O sleeper? arise, call upon thy God, if so be that God will think upon us, that we perish not.

1:7 And they said every one to his fellow, Come, and let us cast lots, that we may know for whose cause this evil is upon us. So they cast lots, and the lot fell upon Jonah.

1:8 Then said they unto him, Tell us, we pray thee, for whose cause this evil is upon us; What is thine occupation? and whence comest thou? what is thy country? and of what people art thou?

1:9 And he said unto them, I am an Hebrew; and I fear the LORD, the God of heaven, which hath made the sea and the dry land.

1:10 Then were the men exceedingly afraid, and said unto him. Why hast thou done this? For the men knew that he fled from the presence of the LORD, because he had told them.

1:11 Then said they unto him, What shall we do unto thee, that the sea may be calm unto us? for the sea wrought, and was tempestuous.

1:12 And he said unto them, Take me up, and cast me forth into the sea; so shall the sea be calm unto you: for I know that for my sake this great tempest is upon you.

1:13 Nevertheless the men rowed hard to bring it to the land; but they could not: for the sea wrought, and was tempestuous against them.

1:14 Wherefore they cried unto the LORD, and said, We beseech thee, O LORD, we beseech thee, let us not perish for this man's life, and lay not upon us innocent blood: for thou, O LORD, hast done as it pleased thee.

1:15 So they look up Jonah, and cast him forth into the sea: and the sea ceased from her raging.

1:16 Then the men feared the LORD exceedingly, and offered a sacrifice unto the LORD, and made vows.

1:17 Now the LORD had prepared a great fish to swallow up Jonah. And Jonah was in the belly of the fish three days and three nights.

2:1 Then Jonah prayed unto the LORD his God out of the fish's belly,

2:2 And said, I cried by reason of mine affliction unto the LORD, and he heard me; out of the belly of hell cried I, and thou heardest my voice.

2:3 For thou hadst cast me into the deep, in the midst of the seas; and the floods compassed me about: all thy billows and thy waves passed over me.

2:4 Then I said, I am cast out of thy sight; yet I will look again toward thy holy temple.

2:5 The waters compassed me about, even to the soul: the depth closed me round about, the weeds were wrapped about my head.

2:6 I went down to the bottoms of the mountains; the earth with her bars was about me for ever: yet hast thou brought up my life from corruption, O LORD my God.

2:7 When my soul fainted within me I remembered the LORD: and my prayer came in unto thee, into thine holy temple.

2:8 They that observe lying vanities forsake their own mercy.

2:9 But I will sacrifice unto thee with the voice of thanksgiving; I will pay that that I have vowed. Salvation is of the LORD.

2:10 And the LORD spake unto the fish, and it vomited out Jonah upon the dry land.

Here prayer (and human sacrifice), rather than magic is involved, but clearly the interaction with a divinity makes this a religious act rather than a magical one. The ocean also supplies food to a large portion of the population. Hence fishing (in a most general sense -i.e. getting food from the ocean whatever it may be - animal or vegetable and whether the animal is invertebrate or vertebrate regardless of whether it is a clam, a lobster or sea cucumber as an invertebrate or a fish or mammal as a vertebrate) is very important to people who live on the shores of the ocean. The food can be important to the people as something they themselves eat, or it may be traded or exported for money. The ocean is a major economic resource for many people.

In places like Japan, there are problems with the small amount of arable land. There are many mountains and areas unsuitable for farming and many of the areas that might have been usable were sufficiently flat that cities were built on them. As a result, the Japanese have used the ocean as the Americans used the Plains. Rice farming is the major food source, but food from the sea is found everywhere. Many Buddhists who are largely vegetarians will eat fish and other animals from the sea.

FOOD TABUS

Some food tabus cross the line between food and religion, although there are non-religious rejections of certain items as food (technically, these are not tabus). Everywhere in the world, there are edible materials that the people normally do not eat. Some restrictions on eating are religious and some are not. In America, by and large insects are considered inedible, although other cultures eat them with no problems: grasshoppers, water bugs and so on are all potentially food. Chinese avoid milk and many milk products. Chinese report that milk is something excreted by the body like sweat which Americans would doubtless find unappealing as well! (Despite this, Japan has a soda with the rather unpleasant name (to Americans) of Pocari Sweat. (To the Japanese the metaphor seems to imply "sports"

Most, if not all, mammals are edible but people in different cultures do not eat them. Americans do not eat dogs, cats or horses. Generally, Americans do not eat snakes, although for some people the eel, snake like in general appearance is OK. Shellfish may be avoided. Many Americans are unhappy about eating squid, while other cultures think it fine. Some foods are just culturally not identified as "food" whereas others are tabooed by religion.

Some are suggested not to be eaten (no meat on Fridays) or during Lent (Carnival is from Carne Vale – Farewell to Meat).

The prohibition against eating pork by Jews and Muslims is another example. The book of Leviticus deals with the notion of cleanliness and uncleanness. It details the kinds of animal sacrifices to be made to remove an unclean state. It deals with uncleanness caused by illness. Probably, the most famous injunctions for us are those from the book of Leviticus in the Bible. This book deals largely with ritual behavior and the concepts of cleanliness and lack thereof. In chapter 11 contains the prohibitions against the eating of pork. The prohibition against eating pork applies not only to Jews but Muslims as well. In addition, Leviticus prohibits the eating a large number of food items some of which come from the ocean (verse 9) Leviticus prohibits the eating of things from the waters, which do not conform to a rule that says:

9 Many creatures live in the water of the oceans and streams. You can eat all those that have fins and scales.

10 Treat as "unclean" all the creatures in the oceans or streams that do not have fins and scales. That includes all those that move together in groups and all those that do not.

11 Treat them as "unclean." Do not eat their meat. Treat their dead bodies as "unclean."

12 Regard as "unclean" everything that lives in the water that does not have fins and scales.

Here is Chapter 11 in its entirety in two translations

CHAPTER 11

1 The LORD spoke to Moses and Aaron. He said to them,

2 "Speak to the Israelites. Tell them, 'Many animals live on land. Here are the only ones you can eat.

3 You can eat any animal that has hooves that are separated completely in two. But it must also chew the cud.

4 Some animals only chew the cud. Some only have hooves that are separated in two. You must not eat those animals. Camels chew the cud. But their hooves are not separated in two. So they are "unclean" for you.

5 Rock badgers chew the cud. But their hooves are not separated in two. So they are "unclean" for you.

6 Rabbits chew the cud. But their hooves are not separated in two. So they are "unclean" for you.

7 Pigs have hooves that are separated completely in two. But they do not chew the cud. So they are "unclean" for you.

8 You must not eat the meat of those animals. You must not even touch their dead bodies. They are "unclean" for you.

9 Many creatures live in the water of the oceans and streams. You can eat all those that have fins and scales.

10 Treat as "unclean" all the creatures in the oceans or streams that do not have fins and scales. That includes all those that move together in groups and all those that do not.

11 Treat them as "unclean." Do not eat their meat. Treat their dead bodies as "unclean."

12 Regard as "unclean" everything that lives in the water that does not have fins and scales.

13 Here are the birds you must treat as "unclean." Do not eat them because they are "unclean." The birds include eagles, vultures and black vultures.

14 They include red kites and all kinds of black kites.

15 They include all kinds of ravens.

16 They include horned owls, screech owls, gulls and all kinds of hawks.

17 They include little owls, cormorants and great owls.

18 They include white owls, desert owls and ospreys.

19 They also include storks, hoopoes, bats and all kinds of herons. 20 Treat as "unclean" every flying insect that walks on all fours.

21 But you can eat some flying insects that walk on all fours. Their legs have joints so they can hop on the ground.

22 Here are the insects you can eat. You can eat all kinds of locusts, katydids, crickets and grasshoppers.

23 Treat as "unclean" every other creature with wings and four legs.

24 You will make yourselves "unclean" if you eat these things. If you touch their dead bodies, you will be "unclean" until evening.

25 If a person picks up one of their dead bodies, that person must wash their clothes. They will be "unclean" until evening.

26 Suppose an animal has hooves that are not separated completely in two. Or suppose an animal does not chew the cud. Then these animals are "unclean" for you. If you touch the dead body of any of them, you will be "unclean."

27 Many animals walk on all fours. But those that walk on their paws are "unclean" for you. Anyone who touches their dead bodies will be "unclean" until evening.

28 If a person picks up their dead bodies, that person must wash their clothes. They will be "unclean" until evening. These animals are "unclean" for you.

29 Many animals move along the ground. Here are the ones that are "unclean" for you. They include weasels, rats and all kinds of large lizards.

30 They also include geckos, monitor lizards, wall lizards, skinks and chameleons.

31 These are the animals that move around on the ground that are "unclean" for you. If you touch their dead bodies, you will be "unclean" until evening.

32 Suppose one of them dies and falls on something. Then that thing will be "unclean." It does not matter what it is used for. It does not matter whether it is made out of wood, cloth, hide or rough cloth. Put it in water. It will be "unclean" until evening. After that, it will be "clean."

33 Suppose one of these animals falls into a clay pot. Then everything in the pot will be "unclean." You must break the pot.

34 Any food that could be eaten but has water on it that came from that pot is "unclean." And any liquid that could be drunk from it is "unclean."

35 Anything that the dead body of one of these animals falls on becomes "unclean." If it is an oven or cooking pot, break it. It is "unclean." And you must consider it "unclean."

36 But a spring or a well for collecting water remains "clean." That is true even if the dead body of one of these animals falls into it. But anyone who touches the dead body is not "clean."

37 If the dead body falls on any seeds that have not been planted yet, the seeds remain "clean."

38 But suppose water has already been put on the seeds. And suppose the dead body falls on them. Then they are "unclean" for you.

39 Suppose an animal you are allowed to eat dies. If anyone touches its dead body, they will be "unclean" until evening.

40 If they eat part of the dead body, they must wash their clothes. They will be "unclean" until evening. If they pick up the dead body, they must wash their clothes. They will be "unclean" until evening .

41 Treat as "unclean" every creature that moves along the ground. Do not eat it.

42 Do not eat any of these creatures. It does not matter whether they move on their bellies. It does not matter whether they walk on all fours or on many feet. It is "unclean."

43 Do not make yourselves "unclean" by eating any of these animals. Do not make yourselves "unclean" because of them. Do not let them make you "unclean."

44 I am the LORD your God. Set yourselves apart. Be holy, because I am holy. Do not make yourselves "unclean" by eating any creatures that move around on the ground.

45 I am the LORD. I brought you up out of Egypt to be your God. So be holy, because I am holy.

46 These are the rules about animals and birds. These are the rules about every living thing that moves around in the water. And these are the rules about every creature that moves along the ground.

47 You must be able to tell the difference between what is “clean” and what is not. You must also be able to tell the difference between living creatures that can be eaten and those that can’t.’”

And a different translation

1 And the Lord spake unto Moses and to Aaron, saying unto them,

2 Speak unto the children of Israel, saying, These are the beasts which ye shall eat among all the beasts that are on the earth.

3 Whatsoever parteth the hoof, and is clovenfooted, and cheweth the cud, among the beasts, that shall ye eat.

4 Nevertheless these shall ye not eat of them that chew the cud, or of them that divide the hoof: as the camel, because he cheweth the cud, but divideth not the hoof; he is unclean unto you.

5 And the coney, because he cheweth the cud, but divideth not the hoof; he is unclean unto you.

6 And the hare, because he cheweth the cud, but divideth not the hoof; he is unclean unto you.

7 And the swine, though he divide the hoof, and be clovenfooted, yet he cheweth not the cud; he is unclean to you.

8 Of their flesh shall ye not eat, and their carcase shall ye not touch; they are unclean to you

9 These shall ye eat of all that are in the waters: whatsoever hath fins and scales in the waters, in the seas, and in the rivers, them shall ye eat.

10 And all that have not fins and scales in the seas, and in the rivers, of all that move in the waters, and of any living thing which is in the waters, they shall be an abomination unto you:

11 They shall be even an abomination unto you; ye shall not eat of their flesh, but ye shall have their carcasses in abomination.

12 Whatsoever hath no fins nor scales in the waters, that shall be an abomination unto you.

13 And these are they which ye shall have in abomination among the fowls; they shall not be eaten, they are an abomination: the eagle, and the ossifrage, and the ospray,

14 And the vulture, and the kite after his kind;

15 Every raven after his kind;

16 And the owl, and the night hawk, and the cuckow, and the hawk after his kind,

17 And the little owl, and the cormorant, and the great owl,

18 And the swan, and the pelican, and the gier eagle,

19 And the stork, the heron after her kind, and the lapwing, and the bat.

20 All fowls that creep, going upon all four, shall be an abomination unto you.

21 Yet these may ye eat of every flying creeping thing that goeth upon all four, which have legs above their feet, to leap withal upon the earth;

22 Even these of them ye may eat; the locust after his kind, and the bald locust after his kind, and the beetle after his kind, and the grasshopper after his kind.

23 But all other flying creeping things, which have four feet, shall be an abomination unto you.

24 And for these ye shall be unclean: whosoever toucheth the carcase of them shall be unclean until the even.

25 And whosoever beareth ought of the carcase of them shall wash his clothes, and be unclean until the even.

26 The carcases of every beast which divideth the hoof, and is not clovenfooted, nor cheweth the cud, are unclean unto you: every one that toucheth them shall be unclean.

27 And whatsoever goeth upon his paws, among all manner of beasts that go on all four, those are unclean unto you: whoso toucheth their carcase shall be unclean until the even.

28 And he that beareth the carcase of them shall wash his clothes, and be unclean until the even: they are unclean unto you.

29 These also shall be unclean unto you among the creeping things that creep upon the earth; the weasel, and the mouse, and the tortoise after his kind,

30 And the ferret, and the chameleon, and the lizard, and the snail, and the mole.

31 These are unclean to you among all that creep: whosoever doth touch them, when they be dead, shall be unclean until the even.

32 And upon whatsoever any of them, when they are dead, doth fall, it shall be unclean; whether it be any vessel of wood, or raiment, or skin, or sack, whatsoever vessel it be, wherein any work is done, it must be put into water, and it shall be unclean until the even; so it shall be cleansed.

33 And every earthen vessel, whereinto any of them falleth, whatsoever is in it shall be unclean; and ye shall break it.

34 Of all meat which may be eaten, that on which such water cometh shall be unclean: and all drink that may be drunk in every such vessel shall be unclean.

35 And every thing whereupon any part of their carcase falleth shall be unclean; whether it be oven, or ranges for pots, they shall be broken down: for they are unclean, and shall be unclean unto you.

36 Nevertheless a fountain or pit, wherein there is plenty of water, shall be clean: but that which toucheth their carcase shall be unclean.

37 And if any part of their carcase fall upon any sowing seed which is to be sown, it shall be clean.

38 But if any water be put upon the seed, and any part of their carcase fall thereon, it shall be unclean unto you.

39 And if any beast, of which ye may eat, die; he that toucheth the carcase thereof shall be unclean until the even.

40 And he that eateth of the carcase of it shall wash his clothes, and be unclean until the even: he also that beareth the carcase of it shall wash his clothes, and be unclean until the even.

41 And every creeping thing that creepeth upon the earth shall be an abomination; it shall not be eaten.

42 Whatsoever goeth upon the belly, and whatsoever goeth upon all four, or whatsoever hath more feet among all creeping things that creep upon the earth, them ye shall not eat; for they are an abomination.

43 Ye shall not make yourselves abominable with any creeping thing that creepeth, neither shall ye make yourselves unclean with them, that ye should be defiled thereby.

44 For I am the Lord your God: ye shall therefore sanctify yourselves, and ye shall be holy; for I am holy: neither shall ye defile yourselves with any manner of creeping thing that creepeth upon the earth.

45 For I am the Lord that bringeth you up out of the land of Egypt, to be your God: ye shall therefore be holy, for I am holy.

46 This is the law of the beasts, and of the fowl, and of every living creature that moveth in the waters, and of every creature that creepeth upon the earth:

47 To make a difference between the unclean and the clean, and between the beast that may be eaten and the beast that may not be eaten.

People for a long time have recognized that there must be some reasons for these tabus.

The famed Jewish scholar Maimonides (Rabbi Moses ben Maimon, born 1135 or 1138, died 1204) was one of the first to look for a reason for the

prohibition against eating pork in the real world. He thought that the pigs eating habits made it unclean.

Others argued was that pork contains a parasite a round worm (nematode) which causes trichinosis. That can be passed on to humans. His argument, while interesting had problems in that there are other animals not tabooed in the area that have parasites that are much worse. He feels that pigs supply only meat whereas sheep supply wool as well as meet.

More recently, noted anthropology Marvin Harris proposed that ecology and economics are at the root of the problem. Pigs are omnivores as eat similar food to people and hence are in competition for the same foodstuffs. So the keeping of pigs is detrimental. In addition, aside from pork, pigs produce no other useful products. Sheep produce wool; goats produce milk and so on. So the prohibition against easting pork makes it likely that people will not raise pigs. Since then it appears that there are some people in the area that raise pigs and seem not concerned about the competition. Nonetheless, the process of raising them may be edgy.

Others have pointed out pigs are not unclean unless they are starved, there are far worse parasites to be found than trichinosis in animals which are not tabued. Some people in the Middle East DO raise and eat pigs.

Similar arguments have been made about the idea of eating fish on Fridays. In Europe, grazing land is scarce and as a result, large herds of cattle are not easily maintained. The injunction to eat fish on Friday has some relevance to the fact that red meat would have perhaps been put under a strain without such a prohibition.

Mary Douglas in her book on Natural Symbols makes further argument, one of which is that there are people in the middle east that do deal with pigs and that this is a symbolic way of being different.

Mary Douglas, another anthropologist approached the problem symbolically and points out that people classify animals based on a number of things. Generally, for example, things that live in the water are called "fish". Her argument is that "fish" become the "proper kind of animal" and things which lack the criteria of "fish" - gills, fins etc. are seen as "improper" hence unclean and should not be eaten. There is little doubt that the debate is not yet over.

Interestingly enough, many animals are rather "picky" eaters and have rather restricted diets although this is obviously not seen as cultural.

Although not having to do with water, other cultures, like some in places like India, reject the killing of cattle and there is also a lively debate about why this should be. These arguments are often based around the idea that culture is "adaptive" and there seem to be many places where it seems maladaptive (until someone finds a way to show it is adaptive). So the arguments continue and so the battle continues on.

Some might argue that the shorter term prohibitions, like restriction of specific days of the week (meatless Fridays) or seasons (like lent) when certain foods should not be eaten might be good for preserving the animals population.

Similarly, there are many things in the ocean that are edible, but people do not want to eat.

Other problems with food deal with matters outside (to some degree) of culture. In the Viking case, the weather change is outside of Viking control, but the religious problems complicated the issue.

Mini Ice Age and the Vikings. 1300 – 1850 (alternately some feel it was from the 16th to the 19th centuries) temperatures in Greenland dropped about 7 degrees F or 4 degrees C. This led to longer periods of sea ice making travel and trade difficult. Shorter growing seasons impacted the food supply and fish moved south into warmer waters. Eskimo did OK fishing through the ice. Vikings couldn't learn because they had become Christians and Eskimos had rituals to animals they were about to kill or killed which seem to have been anathema to the Christian Vikings who went to church, prayed and died, while the pagan Eskimos did OK.

Movement of fish in Greenland is not the only problem of this sort based on weather change. The Greenland one was rather long lasting and came once. Others are more complex.

So prohibitions might involve a day (try not to eat meat on Friday) to a couple of weeks (Lent) or a few months. In America there is a nice saying that indicates a cultural (but not religious) prohibition against eating oysters in months without the letter "R"

DON'T EAT OYSTERS IN MONTHS WITHOUT THE LETTER "R"

Other forms are dangerous only at certain times. The phrase "Do not eat oysters in months without 'r's" may sound silly but has some validity. R-less months are in the summer when algal blooms are likely. Many of these contain a toxin and oysters filter feed on the algae, thus becoming somewhat toxified themselves. Through "bio magnification" (in which a toxin, for example, increases in the body as each higher animal up the food chain eats the one below) can cause serious illness in humans eating oysters with high levels of toxicity.

So, while religion is also involved in tabuing food, no culture has been found where all edible resources are utilized. Some aversion seems to be just cultural in the sense that the object is not seen as food. In America, insects are not considered food, but in other places in the world, they are. There are no supernatural proscriptions against eating insects, just an aversion that insects are not food.

Other taboos may be related to objects associated with fishing and specifically the foods involved. On the NW Coast, fishing equipment is stored indoors during the winter. This brings with it a tabu about having sex in the houses since the equipment is stored there. When spring arrives and days become warm enough, people have sex outdoors and hence the birth rates are much higher starting 9 months after the first warm days a spring.