INTRODUCTION

In Epistle 95, Lucius Seneca, who lived from about 4 B.C.E. to 65 A.D., describes the most expensive Roman fish sauce *garum sociorum* as "the overpriced guts of rotten fish!" [1] The sauce was made by fermenting fresh blood and viscera of fish with salt until a liquid formed. It was used as a Roman table condiment as salt is today.

Anchovies, which were one of the fish used in making liquamen, another popular Roman fish sauce, and sometimes *garum*, are a misunderstood delicacy. They are either loathed or loved. Most often they go completely unnoticed, their fermented salinity and meatiness dissolve into sauces and stews. Without that "salted putrefaction"[2] that Seneca described, there would be no Worcestershire sauce, *pasta alla puttanesca*, *salsa verde*, *bagna cauda*, or Caesar salad dressing.

Anchovies are a somewhat recent addition to the American pantry in the form of salted fillets and Asian fish sauces. Rarely do we see fresh anchovies in the market. When we see the salted variety, they're often gray hued, fishy tasting, and mushy in texture – hardly the picture of a delicious salted anchovy. Anchovies are a misunderstood ingredient in Italy, as well. While they are an Italian cooking staple, most Italians are unaware of the process needed to properly salt anchovies or when they are best to consume, nor do they understand the fishing pressures placed on the Mediterranean anchovy and on the entire Engraulidae fish family. Overfishing is rampant and young anchovies are often poached during the off-season before they've had a chance to reproduce.

This paper will highlight the history of anchovies, including the story of salt, salted fish, and its most historical application, fish sauce. It will explore how they should taste when salted and this author's personal quest for a good tasting and sustainably caught Mediterranean anchovy.

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[1] Curtis, Robert I. "In Defense of Garum." The Classical Journal. Feb.-Mar. 1983, p. 232.
[2] Ibid.

ABOUT ANCHOVIES

Anchovies are members of the Clupeid or herring family – a group of small, flavorful, oily fish that are generally referred to in Italian as *pesce azzurro* or blue fish. Anchovies have large eyes, silvery-blue skin, and a large mouth with a short lower and large upper jaw. They can live for up to four years and can grow up to 20 centimeters (about 8 inches) long.[3] Throughout the world's temperate and tropical seas, there exist up to 145 species of anchovies.[4] Sixteen of those can be found in American waters, but these varieties are typically used as live bait or fishmeal. Only five are used for human consumption. The most popular three of those five include the Peruvian anchovy (*Engraulis ringens*), Japanese anchovy (*Engraulis japonicas*), and European anchovy (*Engraulis encrasicolus*) (FIG. 1). The anchovy of culinary notoriety is the European anchovy of the Mediterranean Sea, the Black Sea, the Azov Sea, and the warmer waters of the east Atlantic coasts.[5]

Peruvian anchovies are a bit smaller than the Mediterranean species and though humans can consume them, they are usually turned into fish oils or fishmeal for livestock. Atlantic anchovies differ from their Mediterranean counterparts – they swim in colder waters and against stronger currents, and therefore have firmer flesh. While many like the flavor of cold-water anchovies, others think the Mediterranean version have a gentler taste.

Fresh anchovies are mildly sweet. Because they are highly perishable, they are most often salted, canned, smoked, or dried, made into pastes and fish sauces, or mixed into butters and creams.[6] Anchovies can be caught year round, but in the Mediterranean they swim inland to spawn between March and September.

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[3] Hall, Christopher. "Homage to the Anchovy Coast." Smithsonian Magazine May 2005: p.101
[4] Johnson, Paul. *Fish Forever: The Definitive Guide to Understanding, Selecting, and Preparing Healthy, Delicious, and Environmentally Sustainable Seafood.* Hoboken: John Wiley & Sons, Inc., 2007. p. 43.
[5] Eurofish International Organization, "Overview of the world's anchovy sector and trade possibilities for Georgian anchovy products." Copenhagen, Feb. 2012: p. 5.
[6] Davidson, Alan. *The Oxford Companion to Food.* Oxford: Oxford University Press, 1999. p. 17.

FIG. 1. European anchovy (*Engraulis encrasicolus*)[7]

Anchovies are one of the most highly productive and widespread fish in the sea. They travel in densely packed schools and feed at the water's surface by constantly swimming and straining hundreds of gallons of microscopic plankton each day from the ocean.[8] At night, they disperse into shallower water, and are drawn to the surface during a full moon.

Their high fat content, which can reach up to twenty percent as they approach spawning and makes them vulnerable to oxidization once caught, make it essential to eat or process anchovies immediately. Of a large catch of anchovies, some will be used fresh by locals, but most go immediately under salt or frozen to be sold later and at a higher price. Unlike sardines, anchovies are loved for their gentle and delicate yet pronounced flavors.[9]

For centuries salted anchovies have been used as a seasoning in sauces and over meats and vegetables.[10] In *On Food and Cooking* Harold McGee describes the range of flavors created by the salting process of fish. He says,

> "Enzymes from the muscle, skin, blood cells, and bacteria generate many flavor components; and their concentration, together with the warm curing temperature, encourage early stages of the browning reactions, which generate another range of aromatic molecules. The result is a remarkable full flavor that includes fruity, fatty, fried, cucumbery, floral, sweet, buttery, meaty, popcorn, mushroom, and malty notes."[11]

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[7] http://armacao.web.fc2.com/biqueirao_1.htm
[8] Johnson, Paul. *Fish Forever: The Definitive Guide to Understanding, Selecting, and Preparing Healthy, Delicious, and Environmentally Sustainable Seafood.* Hoboken: John Wiley & Sons, Inc., 2007. p. 43.
[9] Artusi, Pellegrino. *La Scienza in cucina e l'Arte di mangier bene.* Firenze: 1932. p. 337.
[10] Schwartz, Arthur. *Naples at Table: Cooking in Campania*. New York: Harper Collins, 1998. p. 1.
[11] McGee, Harold. *On Food and Cooking: The Science and Lore of the Kitchen.* New York: Scribner, 1984. p.232-3.

The taste of a salted anchovy is thought to be that of umami – the fifth flavor after sweet, sour, bitter, and salt. Umami is described as the savory taste of proteins (meats, mushrooms, funky cheeses, and monosodium glutamate), which adds an inexplicable complexity to a dish[12].

A good tasting salted anchovy is one that has been fished at the height of the season (in the Mediterranean, between March and July), gutted immediately, and properly cured. The process of salting fish is part art, part science. Using pure salt is crucial when curing fish. Even small amounts of sulfates, magnesium, or calcium in the salt can stunt the curing process and make the protein bitter. The amount of salt used depends on the salt's purity and grain size: the purer the salt and finer the grain, the less salt is needed. [13] McGee explains that, "saturating the fish with around 25% salt keeps it stable for a year."[14] Leaner fish like cod are first salted and then air-dried, while oily fish like anchovies and other fish in the herring family are immediately salted or smoked to prevent rancidity. "The best of these are the piscatory equivalent of salt-cured hams," writes McGee.[15] Salt allows the enzymes of both the fish and the harmless, salt-resistant bacteria to transfer the fat and proteins into complex flavors.[16]

A skilled anchovy curer must understand the balance of salt, oxygen levels, temperature, humidity, and the overall duration of the cure for a final product that tastes like a fine-cured meat or a well-aged cheese. The anchovy fillet should be a deep-pink color and should not taste overtly fishy.[17] In the past, some anchovy curers would dye anchovies and its brine pink to trick consumers into thinking they were properly cured. In "The Cook and Housekeepers Complete and Universal Dictionary" published in 1822, Mary Eaton writes, "choose those which look red and mellow, and the bones must be oily. They should be high flavored, and have a fine smell; but beware of their being mixed with red paint to improve their color and appearance."[18]

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[12] Johnson, Paul. *Fish Forever: The Definitive Guide to Understanding, Selecting, and Preparing Healthy, Delicious, and Environmentally Sustainable Seafood.* Hoboken: John Wiley & Sons, Inc., 2007. p. 45.
[13] McClane, A.J. *The Encyclopedia of Fish Cookery.* New York: Henry Holt and Company, Inc, 1977. p. 276.
[14] McGee, Harold. *On Food and Cooking: The Science and Lore of the Kitchen.* New York: Scribner's, 1984. p. 232.
[15] Ibid.
[16] Ibid. p. 231.
[17] Slow Food Editore. *Ricette di Osterie d'Italia: Il pesce. 600 piatti di mare di lago e di fiume.* Bra: Slow Food Editore, 2004. p. 47.
[18] Kurlansky, Mark. *Salt: A World History.* New York: Penguin Press, 2002. p. 161.

As a consumer it's not easy to know what exactly you are buying. The best way is to ask look for small purveyors and ask them how they process their fish. Look for anchovies placed whole under salt. They are a bit more delicate tasting (and surprisingly less fishy and salty tasting) than those filleted and packed under oil. [19] That said, those under oil are quite handy to cook with and can taste delicious if the vendor is conscientious of where his fish are coming from, how they are fished, and how they are processed. (FIG. 2)

FIG. 2. Women at the Balistreri anchovy company in Aspra, Sicily, place fillets into bottles for preserving under oil.[20]

A lot of consumers do not realize that anchovies have a shelf life. Under salt they can keep for eighteen months, but they are optimum after just 5 to 6 months under salt. So if you can find a packing date (which usually you cannot), you'll know about how far along in the salting process your fish are. You do have to keep in mind, too, that the anchovies were salted in larger vats for two and a half to three months prior to packing.

[19] Schwartz, Arthur. *Naples at Table: Cooking in Campania*. New York: Harper Collins, 1998. p. 15.
[20] Santopietro, Jill. Photo. Aspra, Sicily: 2005.

THE ANCHOVY STORY

The story of anchovies is the history of salt, salted fish, and salted fish fermentation in the form of fish sauce.

SALT

For thousands of years, humans have understood the importance of salt to their existence. They are made of it, depend on it to live, and seek it out in all forms, mostly by eating other animals. The first signs of salt production go back to the Neolithic period (the late part of the Stone Age, from roughly 10,000 to 2,000 B.C.E.), when man moved from a life of hunting animals to one of cultivating grains.[21] It didn't take long for people to recognize salt's power to heal and nourish. In Mesopotamia, it became a symbol of friendship. To share salt was to create a deep bond between individuals, and to refuse it was to show hostility. "In the neo-Assyrian period, the phrase *amelu sa tabtiya* (man of my salt) denoted a friend, a person with whom one shared this highly symbolic condiment."[22] The word salt was used in ancient times to identify health. The Roman god of health was *Salus*, and from that root came "salutary" and "salute", which meant (and still does in Italian) a gesture to good health. Roman soldiers were issued quantities of salt or an optional "salarium", or salt money. From *salarium* came today's word "salary".[23] As far back as 2,197 B.C.E., there is evidence that salt was taxed. Cassiodorus, the fifth Century Goth administrator, said, 'It may be that some seek gold, but there lives not a man that does not need salt.'"[24]

Historically salt has been the most widely used ingredient, both as a preservative and a seasoning. Based on evidence found in the Fertile Crescent and along the Mediterranean coasts, salt consumption expanded dramatically from Neolithic times to ancient Roman times. The Phoenicians were the first to established salt works along the western coast of Sicily in Trapani.[25] Archaeological evidence has uncovered saltpans in Egypt and in communities along the Black Sea, as well as along the Atlantic and Mediterranean coasts of Spain and North Africa.

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21 Brothwell, Don, and Patricia Brothwell. *Food in Antiquity*. Baltimore: The John Hopkins University Press, 1998. p.162.
22 Flandrin, Jean-Louis and Massimo Montanari. *Food: A Culinary History from Antiquity to the Present.* New York: Columnia Univeristy Press. 1999. p. 33
23 McClane, A.J. *The Encyclopedia of Fish Cookery.* New York: Henry Holt and Company, Inc, 1977. p.275.
24 Tannahill, Reay. *Food in History.* New York: Three Rivers Press, 1973. p.179.
25 Brothwell, Don, and Patricia Brothwell. *Food in Antiquity*. Baltimore: The John Hopkins University Press, 1998. p.162

Ruins of salteries have also been discovered in Gaul, Sardinia, Sicily, mainland Italy, and Africa Proconsularis (the Roman territories in Africa that once belong to the Carthaginians).[26]

In ancient times salt came from one of three sources: the sea, rock residues of prehistoric oceans, and natural salt springs. The most common form was sea salt, which was either collected in pools of evaporated ocean water or by boiling down ocean water. The Mediterranean Sea has a higher percent of salt than the oceans. As a result most of the salt works were found in the warm, dry coasts along the Mediterranean. Not all areas were rich in salt, and even fewer had pure sodium chloride. The ocean contains, "considerable amounts of magnesium chloride, magnesium sulfate, calcium sulfate and potassium chloride, all of which are undesirable in curing or cooking fish,"[27] explains A.J. McClane in *The Encyclopedia of Fish Cookery.* "The quality of the salt-cured fish is no better than the purity of its preservative."[28]

Control of saltpans has always proved an invaluable political weapon. In China during the first millennium B.C.E., the government managed all saltpans. Venetian sea supremacy was based on the salt trade and wars were fought for control of salt mines. In the 11th century, the Berbes fought the Ghanian Empire for the salt mines of Ankar.[29] Governments raised money by issuing heavy salt taxes and numerous classical texts mention legislation on salt taxing and distribution.[30]

The control of salt stores not only caused wars, but it was a major player in the development of economies. The Egyptians, who traded mostly in wheat and beans, decided that salt was too heavy to transport long distances. So instead they began salting proteins. The salt preserved the food for the long journeys, and these new specialty items sold at much higher prices than the raw materials could themselves. The Egyptians were onto something – "trade in salted food would shape economies for the next four millennium," wrote Mark Kurlansky.[31]

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[26] Curtis, Robert I. "In Defense of Garum." The Classical Journal. Feb.-Mar. 1983, p. 234.
[26] Ibid. p.237.
[27] McClane, A.J. *The Encyclopedia of Fish Cookery.* New York: Henry Holt and Company, Inc, 1977. p.275.
[28] Ibid.
[29] Tannahill, Reay. *Food in History.* New York: Three Rivers Press, 1973. p. 180.
[30] Brothwell, Don, and Patricia Brothwell. *Food in Antiquity*. Baltimore: The John Hopkins University Press, 1998. p.162.
[31] Kurlansky, Mark. *Salt: A World History.* New York: Penguin Press, 2002. p. 44.

SALTED FISH

The Egyptians are credited as the first civilization to salt fish. In *Food in History* by Reay Tannahill, she explains that "in Egypt there was a positive link between salts use in preserving food for the living and embalming the bodies of the dead."[32] But it was the Phoenicians who around 2,800 B.C.E. truly popularized salted fish in the Mediterranean. They traded cedar, glass, and a precious purple dye made from seashells to the Egyptians for salted fish. They then traded Egyptian salted fish and North African salts to other civilizations throughout the Middle East and Mediterranean.[33]

The ancient Greeks ate a diet that consisted of the occasional salted fish, but they ate it less for sustenance and more for added savor. However, evidence exists that they revered the protein. They "developed an entire vocabulary for salt fish, describing the type of cure, the place of origin, the cut of fish, salted with scales or without scales."[34] The power-hungry Romans, on the other hand, saw mostly a great deal of money in salted fish. Archaeological evidence proves that very early on in their civilization, Romans began processing salted fish on an industrial level.[35] They learned to farm fish in inland pools and marine enclosures.[36]

As the Roman Empire expanded across the Mediterranean, so, too, did the salted fish industry. Travel and trade were relatively free by then, but it was still extremely slow. Only goods that were dried, cured, or pickled could survive the long journeys from opposite ends of the empire. Rome knew that to secure their supremacy meant securing their food supply for their soldiers and communities, and that meant controlling saltpans and the salted fishing industry.

Fast-forward several hundred years to medieval times. If fresh food defined the wealthy, then salted food defined the poor. Salted food was less a luxury, as it was to Romans, and more a necessity. It was poor food not only because it kept for months at a time, but as Alberto Capatti

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[32] Tannahill, Reay. *Food in History.* New York: Three Rivers Press, 1973. p. 54.
[33] Kurlansky, Mark. *Salt: A World History.* New York: Penguin Press, 2002. p. 44.
[34] Ibid. p. 70.
[35] Riley, Gillian. *The Oxford Companion to Italian Food. The Oxford Companion to Italian Food.* Oxford: Oxford University Press, 2007. p. 208.
[36] Ibid. p.446.

and Massimo Montanari explain in *Italian Cuisine*, it "guaranteed a minimum of nutritional insurance throughout the year."[37]

Religion also played a role in the popularity of salted fish during the Middle Ages. Thanks to Christian doctrines for Lenten and meatless fasts, fish became the most heavily salted product in medieval Europe. Fast dispensations were near impossible, and breaking the fasts often meant death. The most famous medieval production of salted anchovies was along the Mediterranean coast of France, in a town called Collioure, where salting houses and fleets of small wooden boats called Catalans lined the coast. Collioure's anchovy production was so important to France that in 1466 King Louis XI exempted the town from the loathed *gabelle*, or salt tax.[38]

Meanwhile, Northern seafaring people, including the Scandinavians, the British, and the French, were building strong maritime forces by transporting their large stocks of fish under salt around the world. Throughout the 14th and 15th centuries, the most important salted fish was herring. Found throughout the cold waters of Northern Europe, oily herring was so susceptible to quick spoilage that the Dutch began salting them right onboard their ships. Many believe that the competition among maritime powers over these fish stocks was partly responsible for the colonization of North America.[39] Without the preserved protein, sailors and soldiers couldn't have survived such long journeys. Like salt, salted fish instigated wars and affected global economies like few other food products could. Kurlansky wrote, "For the British, salt was regarded as of strategic importance because salt cod and corned beef became the rations of the British navy. It was the same with the French. In fact, by the fourteenth century, for most of northern Europe the standard procedure to prepare for war was to obtain a large quantity of salt and start salting fish and meat."[40]

With the twentieth century invention of the refrigerator and freezer, came a decline in salted fish production. And with that decline, came an increase in its cost. Today salted fish, like salted cod and anchovies, are an expensive delicacy.[41]

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[37] Capatti, Alberto and Massimo Montanari. *Italian Cuisine: A Cultural History.* New York; Columbia Univeristy Press, 1999. p. 100
[38] Hall, Christopher. "Homage to the Anchovy Coast." Smithsonian Magazine, May 2005: p.103.
[39] Davidson, Alan. *The Oxford Companion to Food.* Oxford: Oxford University Press, 1999. p. 301.
[40] Kurlansky, Mark. *Salt: A World History.* New York: Penguin Press, 2002. p. 127.
[41] Kurlansky, Mark. *Cod: A Biography of the Fish That Changed the World.* New York: Penguin Press, 1998. p. 23.

FISH SAUCE

The history of the anchovy would be incomplete without the sauce that made it famous. *Garum* (the Latin word for fish sauce) was a clear amber sauce made by mixing fish with a concentrated salt-water solution and exposing the brine to the sun for months until the fish fell apart and the solution fermented.

The origin of fish sauce is debatable. Some say the Egyptians were responsible for the salty, unctuous run-off liquids of salting fish. They could be bottled and transported easily, and sold at a higher price than either salt or salted fish. However, the first word for fish sauce was the Greek *gàros,* a sauce similar to Roman *garum* but probably made from different fish using different methods. The Greek playwrights Aritstophanes, Sophocles, and Aeschylus, among others, wrote about Greek *gàros* production in communities along the Black Sea that dated as far back as 600 to 700 B.C.E.[42] According to Jean-Louis Flandrin and Massimo Montanari in *Food: A Culinary History*, *garum* was first made in Corinth and Delos, before being adopted by the Carthaginians and Romans.[43]

Though its exact origin is unclear, what is known is that the Romans were the first to industrialize *garum* production and popularize its use. In the ancient Roman kitchen, *garum* was used in the way that the Chinese use soy sauce today. They added a few drops as a salt substitute to almost everything they cooked, including sauces, stews, casseroles, and even desserts.[44] In *De re coquinaria*, the oldest printed cookbook from the first century A.D. that is credited to Apicius, *liquamen* (the Roman word for fish sauce), is included in most of its nearly 500 recipes. Salt is mentioned in only three.[45] Most recipes in *De re coquinaria* called for ten basic ingredients that were used to either add or disguise flavors. In order of their frequency, these included pepper, *garum*, olive oil, honey, lovage, vinegar, wine, cumin, rue, and coriander.[46]

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42 Smith, Andrew F. "From Garum to Ketchup. A Spicy Tale of Two Fish Sauces." In Fish: Food from the Waters. Edited by Harlan Walker, 1997, Proceedings of the Oxford Symposium on Food and Cookery, Totnes, Devon, UK: Prospect Books, 1998. p. 300

43 Flandrin, Jean-Louis and Massimo Montanari. *Food: A Culinary History from Antiquity to the Present.* New York: Columnia Univeristy Press. 1999. p.82.

44 McGee, Harold. *On Food and Cooking: The Science and Lore of the Kitchen.* New York: Scribner's, 1984. p.235.

45 Zaret, Philip M. "Liquamen and Other Fish Sauces", Repast. Column XX, Number 4, Fall 2004. p. 3.

46 Flandrin, Jean-Louis and Massimo Montanari. *Food: A Culinary History from Antiquity to the Present.* New York: Columnia Univeristy Press. 1999. p.134.

Though *garum* and *liquamen* are often referred to interchangeably, they were different sauces. In *Cooking Apicius*, Sally Grainger explains that *garum* was an expensive table condiment that was rarely used in the kitchen, hence the reason it's not mentioned in *De re coquinaria.* "*Garum* was a sauce made from the fresh blood and viscera of selected fish, mainly mackerel, fermented with salt. As it fermented, the mixture cleared and a dark brine was drawn off."[47] *Liquamen*, on the other hand "was made by dissolving whole small fish, as well as larger pieces of gutted fish (including empty mackerel bodies used to make *garum*), into a liquor with salt. The fish, often anchovy, were layered with salt in a barrel or pit and left for anything up to four months. The whole mixture cleared from the top and settled into layers."[48]

In "*Liquamen* and Other Fish Sauces", Philip Zaret describes the *liquamen* making process: "the fish are alternated with layers of salt until the vat is filled to the brim. Because of the exposure to air, the fish begin to decompose and after a few days, the resulting liquid is drained from below and poured back over the fish; this process is repeated a number of times. After a week or so of this, a wicker lid is placed atop the heap and weighed down, and the fish are left to ferment for several more months."[49] (See FIG. 3.)

FIG. 3. At the Balistreri anchovy fishery, weights press down on salted anchovies.[50]

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[47] Grainger, Sally. *Cooking Apicius: Roman Recipe for Today.* Trowbridge**:** Prospect Books. 2006. p. 27.
[48] Ibid. p. 28.
[49] Zaret, Philip M. "Liquamen and Other Fish Sauces", Repast. Column XX, Number 4, Fall 2004. p.3
[50] Santopietro, Jill. Photo. Aspra, Sicily: 2005.

Apicius describes the *liquamen* formula, "It is best to take large or small sprats, or failing them, anchovies or house-mackerel, make a mixture of all and put into a baking trough. Take 2 pints of salt to the peck of fish and mix well to have the fish impregnated with salt. Leave it for one night, and then put it in an earthenware vessel which you place open in the sun for two to three months [eighteen months for large fish], stirring with a stick at intervals, then take it up, cover it with a lid and store away. Some people add old wine, two pints to 1 pint fish."[51]

The scientific process that transforms fish and salt into an unctuous, shelf-stable fish sauce is quite remarkable. Through osmosis the salt pulls water out from the fish, slowing down the growth of unwanted bacteria and creating the perfect environment for fermentation. Fermentation is a little more difficult to understand. "In its broadest sense fermentation transforms tissue into simpler compounds through the action of enzymes and micro-organisms that produce lactic acid. These microorganisms produce the characteristic flavors and aromas of fermented food." Those flavors include savory and salt, as well as the typical funk that comes with fermenting products like cheese and sauerkraut. This breakdown of the fish makes it more digestible and nutritious.[52]

Other fish sauce products made in ancient Roman times included *allex* (or *alix*, *hallex*, or *allec*), and *muria*. *Allex*, similar to today's anchovy pastes, was the pureed fermented fish remnants from *liquamen* and *garum* making. It was mostly used tableside as a relish or pickle. *Muria* was a pale sauce created from the liquid that leaches out in the early stages of salting whole fish or slices of fish, such as tuna. This brine was far less fishy than both *liquamen* and *garum*.[53]

By mixing fish sauce with other ingredients (honey, herbs, spices, and oil) post manufacturing, Romans created varieties of *garum*.[54] *Garum* mixed with wine was called *oenogarum*, with water (*hydrogarum*), and with vinegar (*oxygarumn*).[55] For the Roman Jewish community there were kosher *garum*s. The Romans also rated their *garum*. The best tasting *garum*, *garum sociorum*, was made from the brined intestines and other wasted parts of mackerels only. It was

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51 Tannahill, Reay. *Food in History.* New York: Three Rivers Press, 1973. p. 83.
52 Downie, David. "A Roman Anchovy's Tale." Gastronomica: The Journal of Food and Culture. Spring 2003: Vol. 3, No. 2, p. 26.
53 Grainger, Sally. *Cooking Apicius: Roman Recipe for Today.* Trowbridge**:** Prospect Books. 2006. p. 28.
54 Zaret, Philip M. "Liquamen and Other Fish Sauces", Repast. Column XX, Number 4, Fall 2004. p. 3.
55 Downie, David. "A Roman Anchovy's Tale." Gastronomica: The Journal of Food and Culture. Spring 2003: Vol. 3, No. 2, p. 27.

made exclusively in the Spanish towns of New Carthage (Cartagena) and Carteia (San Rogue),[56] and from there it was shipped to Puteoli, Italy (north of Pompeii) for bottling. According to Pliny the Elder, "scarcely any other liquid except perfumes has begun to be more expensive, even to the families of the nobility."[57] *Garum sociorum's* excessive cost proved an entertaining topic for the comedians of the day. They couldn't understand why anyone would pay so much for fermented fish guts. "Do you realize that *garum sociorum*, that expensive bloody mass of decayed fish, consumes the stomach with its salted putrefaction," said Pliny.[58]

And yet, as costly as some *garum* varieties (particularly those made exclusively with mackerel, mullet, or eel) were, there is evidence that lesser, cheaper varieties, made with a mixture of tuna, shrimp, squid, cuttlefish, sprats, anchovies, and sardines, were an everyday Roman staple. *Liquamen,* for example, was labeled and rated accordingly: the best was *liquamen optimum*, then *liquamen primum*, and then *liquamen secundum*.[59]

If *liquamen optimium* went to the very wealthy, there was *liquamen secundum* for the poorer classes. The Romans were rather wise. They knew that if they wanted to grow their empire, they needed to make sure the general needs of their people were met. To do this, the Roman state standardized the diet of its people (the plebeians, soldiers, and even slaves). Most plebian citizens ate some form of wheat or barely in a *puls* (a type of gruel) or a flatbread, as well as a porridge of fava beans or lentils, the occasional cheese, fish, or meat, and a *pulmentarium*.[60] The *pulmentarium* consisted of "oil, salt, vinegar, along with other foods that varied with the season, the place, and the nature of the world to be done – olives after the harvest, and when those were none, *hallec* (the fish skin left over from the making of *garum*, a kind of fish sauce), as well as figs for those who toiled in the vineyards as the grapes reached maturity."[61]

Cato's slaves, who received *garum* in their *pulmentarium*, were certainly not eating the *flor floris, garum* from the top of the vat. Like oil from the first press of olives, the *flor floris* was a

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[56] Zaret, Philip M. "Liquamen and Other Fish Sauces", Repast. Column XX, Number 4, Fall 2004. p. 4.
[57] Curtis, Robert I. "In Defense of Garum." The Classical Journal. Feb.-Mar. 1983, p. 234.
[58] Ibid. p.232.
[59] Curtis, Robert I. "In Defense of Garum." The Classical Journal. Feb.-Mar. 1983, p. 235.
[60] Schwartz, Randy, "All Roads Led to Rome: Roman Food Production in North Africa." Repast Fall 2004: Column XX Number 4, p. 5.
[61] Flandrin, Jean-Louis and Massimo Montanari. *Food: A Culinary History from Antiquity to the Present.* New York: Columnia Univeristy Press. 1999. p.131

prized sampling. More likely, Cato's slaves were consuming one of the many inexpensive brands produced by the large-scale *garum* industry. For poor citizens, making a home brew wasn't uncommon. Apicius gives a recipe for homemade garum, "take brine and test its strength by throwing an egg into it to try if it floats; if it sinks the brine does not contain enough salt. Put the fish into the brine in a new earthenware pot, add oregano, put it on a good fire until it boils….let it cool and strain it two or three times, until it is clear."[62] The home brew version was less than adequate because it didn't develop the complexity of flavors that come from slow fermented. But for many, it sufficed.

The Romans appreciated *garum* for its meaty savory flavor – for the taste of salt and protein that it lent to so many of their dishes. They also valued it as for its nutritional benefits. It was believe that a few spoonfuls of *garum* a day provided almost all the nutrients required by the human body.[63] To ancient Roman physicians it was the health benefits of salted fish in a small bottle. Though it was probably unknown at the time, fish-liver oils are high in Vitamin D.[64] The oily fish that were used to make in garum are a good source of omega-3 fatty acids, vitamin B, minerals like selenium, and the brain-boosting DMAE (dimethylaminoethanol).[65] Regardless, the Romans recognized the healing powers of fish sauce, using them as external and internal medicines for both humans and animals. "Columella recommends pouring *garum* into the nostrils of sick animals."[66] According to Pliny, "*Garum* was believed to have the properties of a laxative when mixed with oil, vinegar, or oil and mallows, but Galen also prescribes *garum* with lentils for checking chronic diarrhea. For loss of appetite Pliny recommends *garum* with garden herbs, while grilled snails mixed with wine and *garum* was a remedy for upset stomach. (Pliny 30.44)."[67]

The fact that *garum* was part of the *pulmentarium*, that it appeared in most of the recipes in *De re coquinaria,* and that it was discussed at length by writers like Cato, Pliny, Marital, Varro, Scribonius, Largus, Petronius, and Columella seems evidence enough that it was consumed by

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62 Tannahill, Reay. *Food in History.* New York: Three Rivers Press, 1973. p. 83.
63 Ibid. p. 84.
64 Brothwell, Don, and Patricia Brothwell. *Food in Antiquity.* New York: Frederivk A. Praeger Publishers 1969. p.181-182
65 Johnson, Paul. *Fish Forever: The Definitive Guide to Understanding, Selecting, and Preparing Healthy, Delicious, and Environmentally Sustainable Seafood.* Hoboken: John Wiley & Sons, Inc., 2007. p. 44.
66 Corcoran, Thomas H. "Roman Fish Sauces." The Classical Journal Feb. 1963: Col. 58, No.5, p. 207.
67 Ibid.

the masses throughout Rome. [68] But artifacts and archaeological sites are even further proof of its breadth. With *garum'*s popularity, came mass commercialization of the product. The Romans built factories all over their Empire, choosing certain ports over others. They kept fish sauce making out of cities so as to spare them from the stench. More importantly they chose coastal ports with salty water and salt production, whose waters were teeming with anchovies, sardines, herring, and sprats, and where there was dry heat for the best fish fermenting.[69]

The Romans built factories in Lixus (in what today is Larache), Morocco; Leptis Magna (Khoms), Libya; Gades (Cadiz), Spain; Antipolis (Antibes), France; Clazomenae (Urla), Turkey; and the Pontus region (on the Black Sea, in Northeastern Turkey). In Italy they built factories in Campania's Pompeii, Velia (Elea), and Puteoli (Pozzuili); in Antium (Anzio) and Cosa in Lazio; in Thurii (Thurio) in Calabria; in Sicily, Sardinia, Egypt, and in Dalmatia (Croatia). [70] (See FIG. 4.)

The largest of these factories was said to be in Lixus, in what is today northern Morocco. The oldest, a pre-Roman site was Pontus on the Black Sea and in Malaca, whose name in Carthaginian means "fish-processing place".[71] And the earliest Roman harbor and earliest commercial fishery was the port of Cosa, just east of Rome.[72]

According to Pliny and the artifacts discovered under volcanic ashes, Pompeii was a hub for fish sauce production and commercialization. The bottle found most frequently in the ruined city read "BEST STRAINED *LIQUAMEN* – FROM THE FACTORY OF UMBRICUS AGATHOPUS**.**[73] Artifacts suggest that at the time of the eruption, fish sauce products were being used at inns, wine shops, food shops, hot drink shops, and in most homes. "Of the nearly two hundred vessels discovered so far in Pompieiii and Herculaneum approximately 118 were *garum* vessels, 52 *liquamen*, 21 *muria*, and 11 *allec*," said Curtis.[74]

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[68] Downie, David. "A Roman Anchovy's Tale." Gastronomica: The Journal of Food and Culture. Spring 2003: Vol. 3, No. 2, p. 25.
[69] Ibid. p. 26.
[70] Corcoran, Thomas H. "Roman Fish Sauces." The Classical Journal Feb. 1963: Col. 58, No.5, p. 207.
[71] Corcoran, Thomas H. "Roman Fish Sauces." The Classical Journal Feb. 1963: Col. 58, No.5, p. 208.
[72] McCann, Anne Marguerite. "The Harbor and Fishery Remains at Cosa, Italy." Journal of Field Archeology Winter 1979: Vol. 6, No. 4, p. 411.
[73] Zaret, Philip M. "Liquamen and Other Fish Sauces", Repast. Column XX, Number 4, Fall 2004. p. 3.
[74] Curtis, Robert I. "A Personalized Floor Mosaic from Pompeii." American Journal of Archaeology, Oct. 1984: Vol. 88, No. 4 pp.564.

FIG. 4. Sites of important garum factories throughout the Roman Empire

One of the most important hubs for Roman *garum* production was Spain, which dominated the western fish sauce distribution in the first and second centuries A.D. Spain was also known for making the most prized of *garums*, *garum sociorum.* Their products' reach was vast. Spanish fish sauce vessels have been found at archaeological sites throughout the former Roman Empire, as far north as Britain. "Underwater archaeology shows that there was extensive shipping of Spanish salt fish products to Italy, and finds of Spanish amphorae in towns and military camps show Spanish commercial interests in the interior of the European provinces,"[75] explains Curtis.

The number of factories throughout the Mediterranean and Black Sea massed into an elaborate commercial network for salt, salted fish, and fish sauce. There was so much overlap among the industries. "Salt fish dealers probably also trafficked in fish sauces, but some tradesmen described themselves specifically as merchants in fish sauce." [76] Site workers were either poor or slaves, while merchant owners and shippers grew quite rich. "These wealthy men might have

[75]Curtis, Robert I. "In Defense of Garum." The Classical Journal. Feb.-Mar. 1983, p. 238.
[76] Ibid. p. 238.

constituted a *societus,* a Roman form of corporation, acting either privately or on a contract with the imperial government."[77]

In many ways, the mass production and commercialization of fish sauce, along with olive oil, wine, and wheat, can be credited for helping spark a world economy through the rise of towns, settled agriculture, new food technologies, and improved transportation, including better boats, docks, lighthouses, containers, and roads.[78]

Yet it was Rome's greed, their pursuit of power throughout the Mediterranean that led to their eventual downfall. They were renown for pulling resources from African provinces and then placing heavy taxes on their grains. One instance in 238 A.D. in the town of Thysdrus (modern El Djem in Tunisian) led to an uprising that many believed was the start of the Roman downfall. The riots "quickly engulfed the province of Africa and then the whole Roman Empire, leading to the overthrown of Emperor Maximinus."[79] Struggling to hold on, Rome passed the Constitution of 368 A.D. to make the sale of *garum*, oil, and wine illegal to anyone outside the empire. It backfired as well.

With the fall of the Roman Empire, came a fall in *garum*'s popularity. It's not known exactly why garum fell out of fashion, but many speculate that *garum* factories relied so heavily on government support (both monetary and legislative), that without it, they couldn't survive. While salt works and the anchovy industry continued, fish sauce did not fair as well. There were signs of *garum's* use in medieval times. It was written that in 949 A.D., the Bishop Liutprand of Cremona visited Constantinople and "remarked unenthusiastically on its presence in dishes served to him."[80] But the West slowly lost a taste for the sauce.[81]

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[77] Schwartz, Randy, "All Roads Led to Rome: Roman Food Production in North Africa." Repast Fall 2004: Column XX Number 4, p. 8.
[78] Ibid.
[79] Schwartz, Randy, "All Roads Led to Rome: Roman Food Production in North Africa." Repast Fall 2004: Column XX Number 4, p. 8.
[80] Davidson, Alan. *The Oxford Companion to Food.* Oxford: Oxford University Press, 1999. P. 332
[81] Riley, Gillian. *The Oxford Companion to Italian Food.* Oxford: Oxford University Press, 2007. P. 209

FISH SAUCE TODAY

Though fish sauce fell out of fashion in the western hemisphere, a similar version took the East by storm. Asian fish sauces, made in much the same way as *garum*, are believe to have been created independently of *garum*. There is some speculation, however, about this. After all, the Rome Empire included eastern Turkey, which was located at one end of the Silk Road that led to Chang'an, China. Wealthy Romans depended on trade for their eastern luxuries, which included cinnamon, nutmeg, and silk. So it's perfectly feasible that *garum* was traded in exchange for these products. Many believe, however, that Asian fish sauce was based on a derivation of Chinese soy sauce, which was originally made by fermenting fish with soybeans. Regardless, it was Asia that truly adopted fish sauces after the Romans. Known as *nam pl*a in Thailand, *nuoc mam* in Vietnam, *patis* in the Philippines, *ngan bya* in Burma, *budu* in Malaysia, *teuk trei* in Cambodia, *jeotgal* in Korea, and *ishiru* or *shottsuru* in Japan, fish sauce is used with abandon in so many cuisines, particularly Vietnamese and Thai.

Asian Fish sauces are usually made from fresh anchovies, but they can be made with oysters, shrimp, and other fish, that have been salted and allowed to ferment for months. And like *garum*, not all Asian fish sauces are created equal. Paul Johnson in *Fish Forever* explains,

> "If you are looking for quality Vietnamese fish sauce, keep in mind that fish sauce from the Vietnamese island of Phu Quoc bearing the words *nhi* (best quality) and *ca com* (made of anchovies only) on the label is widely considered by connoisseurs to be definitive of quality fish sauce."[82]

Remnants of *garum* are a bit harder to find in the Mediterranean, but they do exist. In Egypt and Sudan, a strong sauce called *faseekh* is made by fermenting small fish with salt in oil drums. In Cetara, a small fishing town along the Amalfi coast, *colatura* is their signature delicacy – an almost mahogany liquid that's is believe to be a direct descendant of *garum*. The anchovy juices that collect in the vat of salted anchovies are strained off and set in the sun to ferment for several months. For the best *colatura*, "it must come from one of the wooden barrels that once were used to cure the tiny fish. These were only barrels no longer sound enough to age wine. For anchovies, they were equipped with a whole on the bottom to make it possible to draw off

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[82] Johnson, Paul. *Fish Forever: The Definitive Guide to Understanding, Selecting, and Preparing Healthy, Delicious, and Environmentally Sustainable Seafood.* Hoboken: John Wiley & Sons, Inc., 2007. p. 46.

the salty red juices that settled there."[83] Cetara *colatura* has a full-bodied, meaty, savory flavor that is a combination of mellow fishiness and salinity, similar to an exceptional tasting stinky cheese.[84] It's typically mixed with olive oil and tossed in spaghetti, or drizzles over vegetables, meats, and fish. To help preserve their tradition, Cetara *colatura* is a presidium of Slow Food, a movement that started in 1986 in Italy to quell the growth of fast food restaurants and promote and protect regional cuisines and ingredients throughout the world.

Though a taste for *garum* fish sauce fell out of fashion, a reverence for one of its primary ingredients, salted anchovies, grew. In 16th century Europe, when a flood of exotic spices generated a sense of culinary fatigue, many cooks returned to their indigenous ingredients: capers, anchovies, mushrooms, scallions, and anchovies.[85] In the 17th century, the English discovered that salted anchovies dissolved nicely into sauces adding a fragrant hint of salt and sea. As a result its popularity soared. Grimod de La Reybiere, an eighteenth-century anchovy sauce enthusiast, wrote, "when this sauce has been made well, it would make you eat an elephant."[86] In 18th century England a vinegar-anchovy sauce known as *ketchup*, *katsup*, or *catsup*, a name that comes from the Indonesian word for fish and soy sauce, *kecap ikan,* rose in popularity. The English version was a clear, white wine and vinegar sauce with a touch of fish essence and fruity, herbaceous seasonings and spices. Perhaps the English palate dulled over time because they gradually omitted the fish from the sauce. The clear ketchup of the mid-eighteenth century transformed into a lemon sauce, a mushroom sauce, even a walnut sauce, before it became the sweet-and-sour tomato sauce we know today.

There is evidence of distaste for fish sauce in ketchup. In the "Cooks and Housewife's Manual" of 1829, Margaret Dos writes, "anchovies, garlic, cayenne, etc. are sometimes put to this catsup; but we think this is a bad method, as these flavours may render it unsuitable for some dishes, and they can be added extempore when required."[87] In the Mediterranean, anchovies were still elemental to their cuisine. J.B. Reboul, the nineteenth-century Provencal chef, was one of the

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[83] Schwartz, Arthur. *Naples at Table: Cooking in Campania*. New York: Harper Collins, 1998. p. 16.
[84] Slow Food Editore. *Ricette di Osterie d'Italia: Il pesce. 600 piatti di mare di lago e di fiume.* Bra: Slow Food Editore, 2004. p. 49.
[85] Capatti, Alberto and Massimo Montanari. *Italian Cuisine: A Cultural History.* New York; Columbia Univeristy Press, 1999. p. 112.
[86] Kurlansky, Mark. *Salt: A World History.* New York: Penguin Press, 2002. p. 189.
[87] Ibid. p. 190.

first cooks to use anchovies with gusto in his recipes. He developed anchovy pastes, anchovy fillings for pastries, and the Provencal classic *anchiode*.[88]

Around the turn of the century, a surge of tourism brought foreigners from all over Europe to the seaside towns of southern France and Italy, where they were exposed to anchovies, as well as shellfish, olive oils, fresh vegetables, and pastas. As a taste for these products developed so too did the demand for their exportation. The canning and bottling industries of the early nineteenth century gave northerners "sunshine and orchards in a can."[89] Yet, as the canning industry boomed, the salted fish industry plummeted. Canning enabled immediate preservation of fish products without salting. By the turn of the century, many salt fisheries were dying off, and with them the North's salted herring and the South's salted anchovy industries. The invention of the freezer and refrigerator further damaged a demand for salted fish.[90]

[88] Ibid. p. 406-7.
[89] Capatti, Alberto and Massimo Montanari. *Italian Cuisine: A Cultural History.* New York; Columbia Univeristy Press, 1999. p. 31.
[90] Kurlansky, Mark. *Salt: A World History.* New York: Penguin Press, 2002. p. 305.

ANCHOVIES TODAY

My quest for a delicious tasting anchovy that was harvested sustainably led me to Marina di Pisciotta, a small fishing village on the eastern Mediterranean sea in Campania, where an ancient fishing technique helps sustain the region's anchovy population and creates a superior tasting fish.

By day Andrea Fariello, tall, with rough, sun-stained skin, an unkempt beard, and blackened teeth from years of smoking, tends bar along the main strip of Marina di Pisciotta, a sleepy village about 70 miles south of Italy's Amalfi coast in Campania's Cilento National Park. By night he is one of Marina di Pisciotta's anchovy fishermen. What sets him apart from the other anchovy fishermen along the Mediterranean coast is that he is among the few who still use the *menaide*, or *menaica* in dialect, a net dating back to the ancient Romans.

Many towns along the Mediterranean fish for anchovies but the fishermen of Marina di Pisciotta are among the few left that still catch anchovies using this traditional Roman net. (The *Magghia Masculina* anchovy fishermen in the Gulf of Catania, Sicily, still use a drift net similar to the *menaica*, which in Sicilian is known as *magghia*.) In the aftermath of World War II, most anchovy fishermen retired the *menaica* (pronounced ma-NIGH-i-ca) for the *cianciola* — a closed net that catches more fish, faster. The *cianciola* is essentially a purse seine net. In *Fish Forever* Paul Johnson explains, "a purse seine is a wall of netting used to encircle an entire school of fish. A drawstring cable is used to pull or purse, the net tight at the bottom, enclosing the fish in a large pouch."[91] (FIG. 5.) The entire net can then be hauled on board. *Cianciola* (pronounced chan-CHO-la) anchovy fishing involves maneuvering this finer-holed purse seine net into a giant cylinder that hangs vertically from the surface down. A *lamparo*, or a bright lamp used to mock the light of the moon, is illuminated in the center of the cylinder to attract the fish. (FIG. 6.) Once the anchovies gather in the center of the *cianciola's* cylinder, the bottom is sealed off, trapping both adults and immature fish alike. In theory these modern *cianciola* nets are more efficient, but in practice they have significantly lowered the anchovy population by catching the

[91] Johnson, Paul. *Fish Forever: The Definitive Guide to Understanding, Selecting, and Preparing Healthy, Delicious, and Environmentally Sustainable Seafood.* Hoboken: John Wiley & Sons, Inc., 2007. p. 420.

immature anchovies before they've had a chance to spawn. Johnson explains that "purse seines do not affect bottom habitat…but the targeting of immature anchovies is the concern."[92]

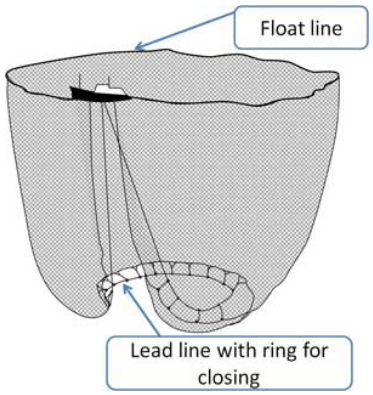

FIG. 5. Purse-seine net[93], or *cianciola.*

FIG. 6. Old lampara, placed in the center of the purse seine netting to attract anchovies, from Balistreri Museum in Aspra, Sicily.[94]

[92] Johnson, Paul. *Fish Forever: The Definitive Guide to Understanding, Selecting, and Preparing Healthy, Delicious, and Environmentally Sustainable Seafood.* Hoboken: John Wiley & Sons, Inc., 2007. p. 420.
[93] http://chioggia.scienze.unipd.it/DB/fishingTechniques2.html. Drawing.
[94] Santopietro, Jill. Photo. Aspra, Sicily: 2005.

Since the introduction of these modern nets, Mediterranean anchovy populations have suffered, forcing anchovy salting houses to look elsewhere — to Morocco, Turkey, Spain's Cantabrian coast (on the Atlantic), Peru, Chili, and Argentina. In October 2004, the owner of Balistreri Girolamo, an anchovy company in Aspra, Sicily, a few miles east of Palermo, explained that his company opened a second operation along the Cantabrian coast (Bay of Biscay) due to low catches in Sicily.[95] The Cantabrian anchovy industry is only about a hundred years old, yet by 2004 its production far exceeded that of the once vibrant Mediterranean ports. In 2005, the Marine Conservation Society had to place a five-year ban on anchovy fishing along the Cantabrian Coast, to help recover anchovy biomass (population).

Eastern Mediterranean fishing ports along the Costa de l'Anxova (Anchovy Coast), a 50-mile stretch running from Catalonia (including the towns of l'Escala and Cadaqués) in the northeastern section of Spain up into a small portion of southwestern France (to the town of Collioure) (See FIG. 7.), are facing similar problems as their Italian counterparts. The Costa de l'Anxova was a hub for anchovy fishing and salting from the Middle Ages until the early 1900s, when their brightly colored, small *catalan* boats were replaced by modern nets and large steel-hulled vessels called *tranyans*. In Collioure, a town once famous for luring the likes of Matisse to draw its picturesque anchovy boats, the modern boats were too large to enter its shallow waters. They were force to dock, instead, in nearby Port Vendres. In 1945 there were 22 fish salting companies in the port of Collioure. By 2005, there were only two.[96] A stock assessment by General Fisheries Commission for the Mediterranean (GFCM) in October of 2011 showed that even though demand for anchovies in this region (the Gulf of Lions) had dropped, the anchovy biomass was still too low. The study reported, "All these signs indicate that the production capacity of the stock, and its potential to sustain an economic activity, is severely hampered, and it is essential to allow it to recover, by preventing the addition of additional sources of mortality to this already depleted population."[97]

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[95] Balistreri Girolamo, Aspra Sicily – interview. Nov. 2005.
[96] Hall, Christopher. "Homage to the Anchovy Coast." Smithsonian Magazine May 2005: p. 103.
[97] Sub-Committee on Stock Assessment, SAC GFCM http://151.1.154.86/GfcmWebSite/SAC/SCSA/13/SAFs/Small-Pelagics/2011_PIL_GSA07_IFREMER.pdf. October 17, 2011.

FIG. 7. Notable Italian, French, and Spanish anchovy fisheries. Blue locales indicate *menaica* fisheries.

When exploitation of a species makes it impossible for a company to fish in their preferred zone, they turn to other areas – areas with perhaps more supply or less regulation. When the moratorium on anchovy fishing was placed on the Cantabrian coast, many Spanish owned anchovy businesses created joint ventures with fisheries in Argentina.

Despite word that anchovy populations are relatively stable, the species is overfished. In 2009, the total world production of anchovies was nearly 10.5 million tonnes. 65% of that or 6.9 million tonnes came from the *Anchoveta*, or Peruvian anchovy, collected by Peruvian and Chilean fisherman. The *Anchoveta* variety is smaller than the European anchovy and is mostly used as fishmeal (to feed livestock) and for their fish oils. Peruvian fisheries have recently uncovered the monetary benefits of selling anchovies for human consumption, and are restructuring their businesses accordingly. The Northwest Pacific – mostly China, Japan, and The Republic of Korea – are responsible for the second largest collection of yearly anchovies tonnes, 11% of the overall catch or 1 million tonnes. The Eastern Central Atlantic, including Morocco, South Africa, Mauritania, and other countries account of 9% of yearly world anchovy catches, or 994,000 tonnes. The Mediterranean and Black Seas (especially Turkey, Italy, Georgia, and Greece) account for 5% of the catch or 563,000 tonnes. The Western Pacific and Southeast Atlantic account for only 3% and 2% respectively. (See FIG. 8.)[98]

[98] Eurofish International Organization, "Overview of the world's anchovy sector and trade possibilities for Georgian anchovy products." Copenhagen, Feb. 2012: p. 5-6.

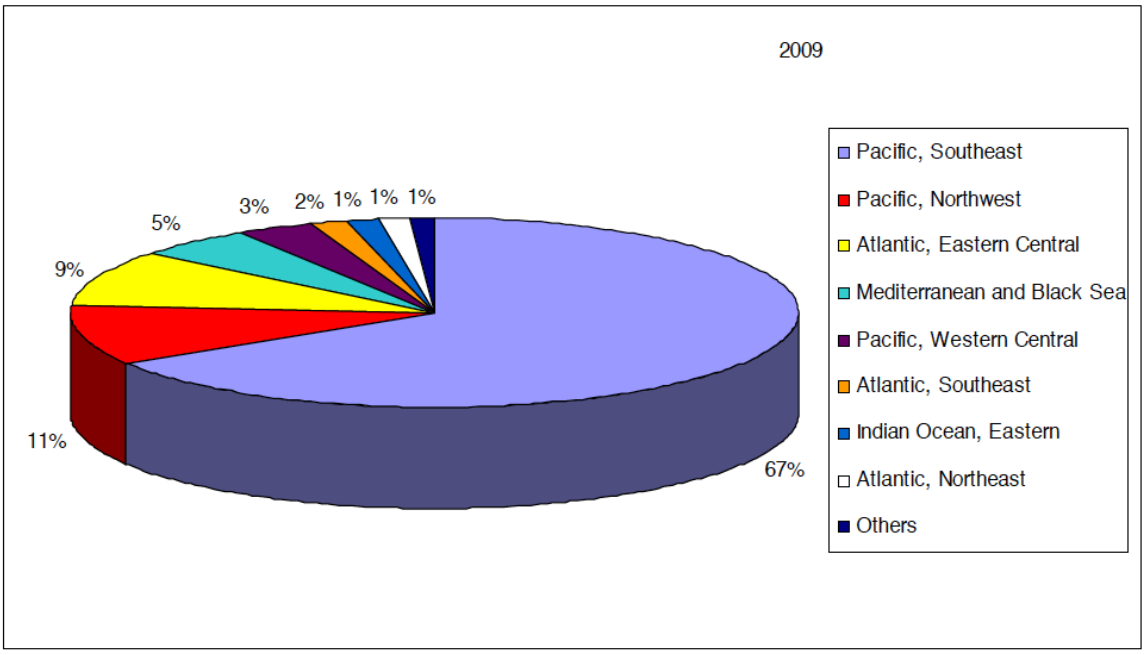

FIG. 8. 2009 world catch of anchovies by region.[99]

In 2009 Peru was the largest fisher of anchovies in the world, catching 5.9 million of the 10.5 million total worldwide tonnes. Chile was second with 1 million tonnes, China was third with 800,000 tonnes, and Turkey was fourth with 522,000 tonnes. Italy is the 15th largest producer of anchovies, while France and Spain fall below the 21st (Greece) and 22nd (Georgia).

Most of the world's anchovies go to fishmeal, fish oils, or other non-human forms of consumption. In 2008, only 369,000 tonnes were processed for human consumption. Of that quantity, 222,000 tonnes were frozen, 74,000 tonnes were prepared or preserved (which includes salting and then packing under oil, marinating, and making pastes) and 73,000 were salted.[100] Japan is the largest producer of frozen anchovies (in 2003, they froze 287,000 tonnes).[101] For prepared and preserved anchovies (not counting strictly salted), Peru has been leading the way since 2007 (with 38,900 tonnes in 2008). Before that, Morocco led the way, and still is the second largest producer of prepared and preserved anchovies, with Spain, Italy and

[99] Eurofish International Organization, "Overview of the world's anchovy sector and trade possibilities for Georgian anchovy products." Copenhagen, Feb. 2012: p.6.
[100] Ibid. p. 9.
[101] Ibid. p. 11.

Croatia following.[102] North Korea and South Korea (which produced 46,100 tonnes in 2008) lead the industry in salted anchovies (dried and salted or salted and canned) with Argentina (11,900 tonnes in 2008) and Italy (12,000 tonnes) well behind.

Spain is the largest importer of fresh and frozen anchovies, with Turkey and Italy behind them. Italy is the largest importer of prepared and preserved anchovies, with France, Spain, the USA, and Albania behind them. Spain is also the largest importer of salted anchovies with Italy, Morocco, and Albania behind them.

The world's largest exporter of fresh and frozen anchovies from 2006 to 2008 was Italy, with Croatia, France, and Greece well behind. The world's largest exporter of prepared and preserved anchovies was Morocco, neck and neck with Peru, and then Italy and Spain well under them. The world's largest exporter of salted anchovies in 2006-2008 was Argentina, with Croatia, Spain and Italy behind.[103]

From this data, it is clear that demands for anchovies are great and the repercussions of those demands on anchovy biomass are detrimental. Let's take a look at Peru, the largest producer of anchovies in the world.

After WWII, the meat and poultry industries grew exponentially. When the California sardine industry plummeted in the 1950s, American entrepreneurs turned to Peruvian fisheries to maintain their supply of fishmeal to feed their growing cattle and poultry industries. For Peru, her landed tonnage increased "by some 400 times between 1938 and 1970."[104] In 1950, the total annual anchovy catch was 86,000 tonnes. In just 20 years, by 1970, the annual catch was 12.4 million, far exceeding what scientist advised as a sustainable yield.[105] In 2009, Peru caught 5.9 million tonnes, still a large number but much improved from their 1970 yields. Since the 1990s Peru initiated a system for setting total catches based on stock assessments. And in 2009 the government introduced an individual quota system. The fishing season was extended to 190 days and the average catches per day decreased to 30,000 tonnes (in the past, a single day could

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[102] Eurofish International Organization, "Overview of the world's anchovy sector and trade possibilities for Georgian anchovy products." Copenhagen, Feb. 2012: p.13.
[103] Ibid. p. 20-21.
[104] Coull, J.R. "The Development of the Fishing Industry in Peru." Geography Nov. 1974: Vol. 59, No. 4, p. 322.
[105] http://www.globalchange.umich.edu/globalchange2/current/lectures/fisheries/fisheries.hmtl

yield as much as 150,000 tonnes of anchovies).[106] There has been improvement but Peru's anchovy production still accounts for 10% of all fish landed in the world.[107]

ITALIAN ANCHOVY FISHERIES AND STOCKS

The total coastline of Italy, including that of Sicily and Sardinia, is over 4,900 miles long with over 800 fishing ports. The hub of Italian fisheries include Palermo, Sicily; Mazara del Vallo (near Sciacca), Sicily; San Benedetto del Tronto, Le Marche; Ancona, Le Marche; Chioggia-Venezia, Veneto; Trieste, Friuli-Venezia Giulia, and Genoa, Liguria. (See FIG. 7.) Up to 50% of the Italian catch is thought to go unrecorded – another factor that makes keeping track of anchovy numbers so difficult.

Throughout the Mediterranean, regulations are administered on a region-by-region basis. Italian regulations make it illegal to catch anchovies that are smaller than 9 cm. However, anchovies reach maturity at 12 cm, which means that the law isn't very useful since anchovies can be caught before they've had a chance to fully grow.[108]

Scientist use sonar, including Virtual Population Analysis (VPA) and the DeLury Model, to collect population data of anchovies on a yearly basis. In the Adriatic Sea, the biomass of anchovy in recent years averaged around 100,000 tonnes. This number is much lower than the average biomass (200,000 tonnes) between 1975 and the early 80s. A decline in anchovy biomass happened after 1978, when it went from 370,000 tonnes to 170,000 tonnes in just three years. When a stock of fish plummets so drastically scientist try to determine causes for the drop. Overfishing was one suspect. The fishing effort increased 76% from 1981 and 1984, and the biomass decreased. But the biomass started to decrease well before the 1981 increase in fishing. According to a study published in Scientia Marina, "the anchovy abundance could have been negatively influenced by summer blooms of phytoplankton and benthic diatoms,

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106 Eurofish International Organization, "Overview of the world's anchovy sector and trade possibilities for Georgian anchovy products." Copenhagen, Feb. 2012: p. 7.
107 Thring, Oliver. "Word of Mouth Blog: Consider the Anchovy", The Guardian January 18, 2011. http://www.guardian.co.uk/lifeandstyle/wordofmouth/2011/jan/18/consider-the-anchovy
108 Lleonart, Jordi and Juan Pablo Pertierra. "NW Mediterranean anchovy fisheries." Scientia Marina. SCI. MAR., 60 (Supl. 2): p. 259.

particularly between 1986 and 1989, by increasing mortality rates of larvae and postlarvae."[109] This, Regner suggested, "was caused by jelly fish predation. An increase in the jellyfish (Pelagia noctiluca) occurred between 1977-1985, when the anchovy stock was not as low as in 1986, so they are not sure they can blame the jellyfish."[110]

From this example you can see how tricky it is to explain a collapse in a stock's biomass. Many factors including El Niño or La Niña years, high levels of plankton, predators like jellyfish, or predators like man, run-off of chemicals used in farming, or farmed fisheries can affect the yearly stock of anchovies. Tuna farming along the Italian coastline, which contributed to the 80,000 tonnes of canned tuna in 2000 (as opposed to 11,000 tonnes of canned anchovies), has become a problem for anchovy populations. It takes 10 to 25 kg of small fish like anchovies to create 1 kg of Bluefin tuna.

In the GSA 16 region, which includes the Central Mediterranean Sea to the Straits of Sicily, the fishing town of Sciacca, Sicily accounts for two-thirds of the total fish yield (1,900 tonnes yearly from purse seiner and pelagic pair trawlers). The average anchovy biomass of the area is 11,550 tonnes, with years as low as 3,100 tonnes to as high as 23,000 tonnes.[111] A report by the Sub Committee on Stock Assessment calls the area of GSA 16 overexploited, with only intermediate abundance of anchovy biomass, and a great risk for stock depletion.

Keeping track of the anchovy numbers is not easy; knowing what's causing their decline is even harder. Because anchovies mature very quickly and can spawn up to several times a year, they are relatively resilient to fishing pressures, compared to most other fish.[112] By swimming in the upper-water column, unwanted by-catch and detrimental habitat destruction are prevented, making anchovy fishing overall less destructive and a bit more sustainable than other forms of fishing. Anchovies, though, are a difficult species to monitor because they fall at the bottom of the food chain. They reproduce so quickly that their populations can increase and decrease

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[109] Arneri, Enrico and Catherine Barry, Andrea Belardinelli, Nando Cingolani, Gianfranco Giannetti, Geoff Kirkwood, Alberto Santojanni. "Trends of anchovy (*Engraulis encrasicolus*, L.) biomass in the northern and central Adriatic Sea" Cientia Marina. SCI. MAR., 67 (Supl. 3): p. 338.
[110] Ibid. p. 338-339.
[111] Sub-Committee on Stock Assessment, SAC GFCM http://151.1.154.86/GfcmWebSite/SAC/SCSA/13/SAFs/Small-Pelagics/2011_ANE_GSA16_CNR-IAMC.pdf. October 28, 2011.
[112] Johnson, Paul. *Fish Forever: The Definitive Guide to Understanding, Selecting, and Preparing Healthy, Delicious, and Environmentally Sustainable Seafood.* Hoboken: John Wiley & Sons, Inc., 2007. p. 42.

based on food supply, currents, predators, and weather.

Anchovy numbers have always fluctuated based on weather patterns and periods of shortage. But as, Christopher Hall wrote in a 2005 article in *Smithsonian Magazine,*

> "Overall catch levels have fallen in the past decade regardless of fluctuations in weather, leading industry experts to worry that the recent downturn is more than just a natural, cyclical phenomenon. They point the finger at fishing practices. For the past 20 years, jumbo-size, highly mechanized ships based in France have roamed the sea throughout the year, scooping up fish in huge dragnets. 'The nets are much finer than what we use on a *tranya* (large steel vessel),"says Josep Lluis Sureda, a fourth-generation l'Escala fisherman. 'All year long they catch everything in their path, even anchovies that are too small for the salters."[113]

In the eastern Mediterranean, along the Campania coast, it is unclear whether the modern purse seine (*cianciola)* nets are responsible for the decline in anchovy numbers. According to a study called the "Evolution of the Artisanal Fishery in Cilento, Italy", "the area is characterized by the scarcity of information on its marine habitat. The only data available on the coastal environment were collected in the Proceedings of the International Conference on 'Coastal marine reserves'", [114] held in Castellabate in June of 1973. Italian legislation that protects the National Park of Cilento-Valle Diano also protects the marine reserves of Santa Maria di Castellabate (north of Pisciotta), Costa degli Infreschi (the area that includes Pisciotta and Marina di Camerota) and Costa di Maratea (south of Pisciotta). "Recreational fishing is not allowed in this reserve and professional fishing is regulated."[115] This, and the stagnant growth of fishing boats in this area (most boats are passed down from father to son), could be responsible for sustain anchovy biomass in the region.

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[113] Hall, Christopher. "Homage to the Anchovy Coast." Smithsonian Magazine May 2005: p.104
[114] Colloca, F., V. Crespi, and S. Coppola. "Evolution of the Artisanal Fishery in Cilento, Italy." Food and Agriculture Organization of the United Nations. Rome, May 2002: 1-68
p.12
[115] Ibid.

For the fishermen of Pisciotta, modern nets not only hurt anchovy biomass but they compromise the flavor of the fish themselves. With the *cianciola*, anchovies of all sizes are pulled from the water and slowly suffocate. It may be hours before a factory worker removes their heads for salting. In that time, the blood can make the flesh taste stale. As with any animal post slaughtering, the blood should be immediately drained so as not to rot the flesh. Fish are no different. Harold McGee, the food scientist and author of *On Food and Cooking*, explained in an email:

> "Residual blood is usually undesirable in animal flesh because the iron in the hemoglobin reacts with fats and oils, breaks them into smaller molecules, and produces stale, rancid flavor notes. Fish oils are especially vulnerable to this. You can't remove all of the blood from the animal's body no matter what you do, but the more blood you do remove, the slower the meat goes bad."[116]

The modern nets catch anchovies of all sizes and maturity – anchovies that should not be placed under salt due to their small size. When small anchovies are salted, the salt eats the flesh too quickly before the right amount of curing has taken place to develop flavor.[117]

Unlike the *cianciola*, the *menaica* is a drift and gill net, which is essentially a curtain of netting that hangs in the water suspended by floats along the top and weights along the bottom. (See FIG. 10) The *menaica* is still attached to the boat. By "drift" it means that the net is not anchored to the bottom. *Menaica* anchovy nets typically stretch up to 600 yards and fall up to 20 feet into the water.[118] The *menaica* is a "gill net" because as the fish ascend to feed on algae, they bump into the netting. The diameter of the *menaica*'s mesh is just the right size to catch larger anchovies at the gill while allowing young anchovies to swim through. As a result, the fishermen of Marina di Pisciotta believe that the *menaica* net has helped sustain the Bay of Pisciotta's anchovy population.

Gill nets are not thought to harm the habitat of the fish, but they have been banned in many parts of the world due to by-catch of non-target species. In the case of the *menaica*, which is

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116 Email from Harold McGee. San Francisco. February 2007.
117 Colloca, F., V. Crespi, and S. Coppola. "Evolution of the Artisanal Fishery in Cilento, Italy." Food and Agriculture Organization of the United Nations. Rome, May 2002: p.35.
118 Colloca, F., V. Crespi, and S. Coppola. "Evolution of the Artisanal Fishery in Cilento, Italy." Food and Agriculture Organization of the United Nations. Rome, May 2002: p.34.

designed specifically to catch only mature anchovies, by-catch is not a problem. The mesh is too small for larger fish to get trapped. “With careful regulation — mesh size, when and where set, how often tended, etc. — gill nets can be a sustainable method of fishing, ” says Johnson.[119]

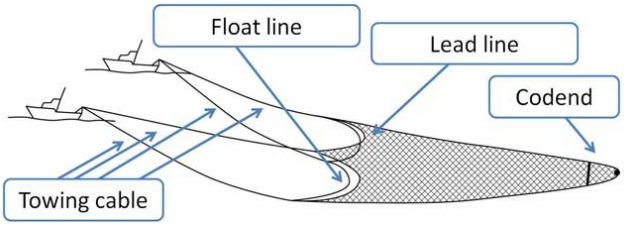

FIG. 9. Pelagic Trawlers (*Volanti*)[120]

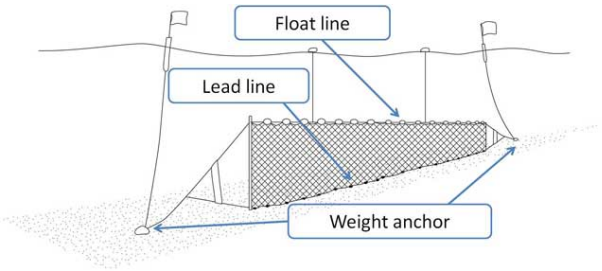

FIG. 10. Gill net, also called static fishing gear. *Menaica* anchvoy nets are similar but they are attached directly to the boat. The netting floats directly on the surface.[121]

The fishermen and people of Pisciotta believe that *menaica* anchovies taste superior to those caught in the *cianciola*. Presumably this is because when the anchovies get stuck in the *menaica’s* mesh, they struggle and start to bleed. To detach them, the fishermen must twist off their heads. It is thought that this immediate bleeding improves the anchovies’ flavor and texture. The salted flesh of a *menaica* anchovy is pink and firm, and tastes like a fine cured-meat.

In June of 2004, I joined Fariello and several *menaica* fishermen to see the process first hand. Fariello used the currents and the stars to guide his small boat to the plankton-rich waters

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[119] Johnson, Paul. *Fish Forever: The Definitive Guide to Understanding, Selecting, and Preparing Healthy, Delicious, and Environmentally Sustainable Seafood.* Hoboken: John Wiley & Sons, Inc., 2007. p. 419.
[120] http://chioggia.scienze.unipd.it/DB/fishingTechniques2.html. Drawing.
[121] http://chioggia.scienze.unipd.it/DB/fishingTechniques2.html. Drawing.

where the anchovies feed about 2 miles from shore. It's a real art to understand the pattern of the fish and the stars. Once in his chosen spot, Fariello stopped the motor to help his three comrades cast the *menaica*. Net in place, the men waited for the sun to set and the anchovies to feed. They ate, too: a chunk of bread, tomatoes and a round of mozzarella, chased down by sugary bottled espresso and cigarettes. The teetering of the boat against forbidding waves didn't faze them. After dinner, they dressed quietly in fishing overalls, rubber boots and yellow slickers. The only visible lights glimmered from shore, where people were dining on last night's catch.

With one light illuminating the boat, a fisherman reeled in the net and buoys while two others stood on either side of it to release each fish, one by one, by hand. There isn't time to waste; the long net pulls up so many fish. It moves like an assembly line. The fourth fishermen steered the boat, maneuvering it in the proper direction using a long oar.

When decapitating the anchovies, the fishermen must pay attention so as not to rip the collarbone. An intact collar is vital for salting the fish later, as it prevents the salt from quickly entering the cavity and corroding the flesh. Once detached, the fishermen dropped the anchovies on board. The blood ran into the ocean through small holes along the deck; the waves sent ocean water back up through the holes, cleaning the fish.

During the peak anchovy months of April, May, and June, the fishermen return to sea as the weather permits. Fortunately for them, the Bay of Pisciotta is rich with the particular plankton on which the anchovies feed. The fishermen were a bit concerned to have a woman on board. Old superstitions are still alive in this town. A woman at sea is bad luck. Fortunately for me, we caught more that night than they had all week!

At 2 a.m., the crew convened at Fariello's bar for a post-fishing snack of *insalata di Pisciotta:* raw anchovies seasoned with salt, a sprinkle of lemon juice, olive oil, parsley and garlic, mopped up with bread. During the high season, this specialty is often served directly off the boats to curious tourists. Some of the anchovies from this catch will be sold to local restaurants, but the majority will go under salt for preservation and use throughout the coming year.

FIG. 11. Andrea Fariello, in plaid shirt, casts his menaica net at sunset.[122]

FIG. 12. Fariello separate fish from the net as it's pulled on board.[123]


FIG. 13. Anchovies stuck in the net's hole.[124]

[122] Santopietro, Jill. Photo. Marina di Pisciotta, Italy: 2005.
[123] Santopietro, Jill. Photo. Marina di Pisciotta, Italy: 2005.
[124] Santopietro, Jill. Photo. Marina di Pisciotta, Italy: 2005.

FIG. 14. Fisherman rests after nights catch.[125]

FIG. 15. Decapitated anchovies ready for gutting and salting.[126]

[125] Santopietro, Jill. Photo. Marina di Pisciotta, Italy: 2005.
[126] Santopietro, Jill. Photo. Marina di Pisciotta, Italy: 2005.

Later that same morning, Donatella Marino packed last night's catch under salt in her bottling center, a.k.a. her garage. Marino, with her husband, Vittorio Rambaldo, runs A'Tartana, one of the town's three portside restaurants. The restaurant is a landmark for Marina di Pisciotta's *menaica* anchovy tradition as it was originally a docking site for anchovy fishing boats. Situated right on the harbor, in the old days boats would pull up right into this former boat garage, where the women would begin cleaning and salting them.

Larger anchovies are better than smaller ones for curing under salt. Small anchovies, though more tender and flavorful, are too delicate for salting. The salt would quickly corrode their flesh. For this reason, the *menaica* anchovies, which are all large thanks to the large holes in the netting, are ideal for salting. Marino sets aside anchovies with missing collars, explaining as the fishermen had, that without the collarbone in place, the salt will quickly eat the flesh.

The quantity of salt is also very important. There cannot be too much or too little. Marino said that as a child her mother would only let her wash the anchovies. Eventually she moved up to deboning them. But salting the anchovies is such an art that it took years to gain her mother's trust before she was allowed try it.

Marino cures the anchovies in lead-free terra cotta using medium-grain Sicilian sea salt. "It's how the ancient Romans did it, all naturally," she said. "It's the little things that make the difference in taste."[127] Marino explains that curing anchovies in breathable terracotta, which invites a small amount of air into the vessel, is crucial to the end flavor and texture of the fish. (FIG. 16.) To prevent breakage, terracotta is usually soaked in a petrol bath before firing. Insisting that their pots be petrol-free, Marino is forced to buy all the pots before firing. She crosses her fingers that not too many break. Marino pays a lot more for these lead-free terracotta pots, which helps explains why salt-cured *menaica* anchovies cost up to five times the price of other salted anchovies. The price of the pots, the labor involved in cleaning and salting each little anchovy, the small catches, short season and demand, explain why in 2004 1 kilogram of anchovies costs 60 euros, while 1 kilogram of generic anchovies costs a mere 10 euros. Buon Italia in Manhattan (www.buonitalia.com) is one of the few places in the United States that sells salted *menaica* anchovies. They sell for a whopping $55 a pound.

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[127] Donatella Marino. Interview. A'Tartana, Marina di Pisciotta, Italy. June, 2005.

Once the pots are full of salt and anchovies, Marino places a heavy rock over each pot. Every morning Marino inspects the salt packed anchovies to make certain the weights don't push them too far down. If so, they could break the terracotta. She also checks that enough *colatura*, or the fish juices that seep out during the salting process, cover the top layer of anchovies. This will help keep out unwanted air. Marino sets clear jars of collected fish juices out on her back patio to bask and mature in the sun. (FIG. 17.)

It takes two and a half to three months under salt for anchovies to cure. Given the proper conditions — a little humidity, 70 degrees, and limited light — they will keep for about eighteen months, although Rambaldo insists they are optimum after five months.[128]

To the residents of Marina di Pisciotta, the benefits of the *menaica* — sustainable fishing and better-tasting anchovies — far outweigh working harder for smaller catches. "The *menaica* is a philosophy," explained Antonio Martuscelli, Fariello's brother-in-law.[129]

But with a population of only 2,880, *menaica* fishing is a dying craft in Marina di Pisciotta. Most of the young residents are moving away from Pisciotta to the cities and into more lucrative industries. For this reason, Marino, Rambaldo, Fariello, and Franco Pugliese created and continue to run the *Alici di Menaica* chapter of Slow Food. They hope that by educating people about their anchovies and the *menaica* net, they will help preserve this tradition. "A lot of the traditions have been lost," said Martuscelli.[130]

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[128] Vittorio Rambaldo. Interview. A'Tartana, Marina di Pisciotta, Italy. June, 2005.
[129] Antonio Martuscelli. Interview. Marina di Pisciotta, Italy. September, 2004.
[130] Antonio Martuscelli. Interview. Marina di Pisciotta, Italy. September, 2004.

FIG. 16. Menaica anchovies placed under sea salt in terracotta.[131]

FIG. 17. *Colatura* (juices rendered from anchovy curing process) ferment in the sun on Marino's patio.[132]

[131] Santopietro, Jill. Photo. Marina di Pisciotta, Italy: 2005.
[132] Ibid.

ANCHOVY RECIPES

Should you be one of the few Americans to visit Marina di Pisciotta between April and early July, you won't find much in the way of nightlife or museums, but you will find anchovies. At A'Tartana, Marino and Rambaldo prepare them every way imaginable: stuffed with ricotta and deep-fried; made into balls and added to tomato sauce; served with pasta and spinach; turned into *torta di alici*, a casserole made with bread, oil and fresh anchovies; marinated; or filleted and served raw in *insalata di Pisciotta*. The cuisine of Marina di Pisciotta is based on the Greek tradition of simple cooking with olives, tomatoes, fish and Mediterranean herbs. Unlike the strong flavors of Sicilian cooking, which included fennel, pine nuts and sweet and sour flavors, Pisciotta's cuisine is quite delicate.

In Italy and Spain, it is common to purchase only a few anchovies (as many as you will consume) from a large open can of salted anchovies. To prevent the anchovies from drying out, the small fish are kept sealed under their briny liquid. If there isn't enough brine to cover the anchovies, a salt solution is made and poured over the anchovies to cover them.[133] Anchovies are stored in their open tins in the refrigerator.

To clean and debone salted anchovies, rinse them under running water, gently removing any large salt crystals. Pull off the small fins on the top and along the belly of the fish. Using your fingers, carefully separate the fish, starting at either the tail or head end and moving along the length of the belly to the opposite end, until you have extricated the fillets. Remove the collarbone, the backbone and any dark residue leftover from the innards. The small bones that are near impossible to remove without breaking the fillets are perfectly edible, and actually nutritious. Do not bother removing them. The backbones can be fried in olive oil for a delicious snack. Oil-packed salted anchovies can simply be rinsed of oil, patted dry, and used as they are.

Fresh anchovies can be cleaned in much the same way as salted ones. To prepare them for curing under salt, use your thumbs to slit open the belly. Next, squeeze the head above the collarbone, being careful to leave the collarbone intact, and firmly pull it and the guts out. If you plan to cook fresh anchovies: pinch off the head (as above) and remove the dorsal and ventral

[133] Ibid.

fins. Using your thumbs, pierce through the belly to slit the anchovy into two fillets, and then remove the guts and the backbone.

There are more ways to use anchovies in the kitchen than imaginable. In the region of Campania, for example, anchovies make their way onto countless pizza, (*pizza alle acciughe or pizza napoletana, and pizza scarola*), into pastas (*pasta cresiuta or spaghetti alla puttanesca*), salads (*insalata di rinforzo*), gratins (*alici al gratin*), and vegetable dishes (*pepperoni in teglia alla napoletana*).[134]

Whole fried anchovies from "*La Scienza in cucina e l'Arte di mangier bene*" by Artusi Pellegrino.

> "If you want to make anchovies and sardines in the best way, fry them, after having taken off the head and having floured them, take them one at a time, immerse them in beaten and well salted egg, then again in the flour and drop them in a pot of boiling oil. Better still if, being large, you open them along the back using a knife and remove their backbone, leaving the fillets united.[135]

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134 Gosetti della Salda, Anna. *Le Ricette Regionali Italiane.* Milano: Casa Editrice "Solares", 2003. p. 17.

135 Artusi, Pellegrino. *La Scienza in cucina e l'Arte di mangier bene.* Firenze: 1932. p. 337.

RECIPES

Insalata di Alici di Marina di Pisciotta

(Photo from The New York Times T Magazine.)

6 fresh, raw, anchovies, rinse and filleted.
Kosher salt
Juice of 1 lemon
1/2 clove garlic, roughly chopped
1/2 tablespoon chopped parsley
Extra-virgin olive oil
Crusty bread.

Place the anchovies on a serving plate. Sprinkle with salt and let sit for 3 minutes. Sprinkle with lemon juice and let sit another minute or 2. Sprinkle with garlic, parley and enough olive oil to cover. Serve with crusty bread. *Serves 1 to 2. Adapted from Mimmo Rambaldo, a former chef at A'Tartana.*

Alici di *Menaica* in Olive Oil With Bread and Fresh Ricotta

2 salted anchovies, preferably *menaica*
About 2 tablespoons red wine vinegar
About 1⁄2 cup extra virgin olive oil
1⁄2 to 2/3 cup fresh ricotta, at room temperature
Salt and freshly ground black pepper
8 to 12 1⁄2-inch-thick slices country bread, lightly toasted.

1. Rinse the anchovies under cold running water, pulling off the salt particles gently with your fingers. Remove the fins and collarbone. Starting at the collarbone, pierce the underside of the fish with your thumbnail and move down the belly to separate into two fillets. Remove the backbone and large bones, leaving the small edible ones. Pat dry. Repeat with each fish.
2. Place the anchovies, flesh side up, on a small plate and pour the vinegar over them just to cover. Let stand for 20 seconds and pour off. Pour enough olive oil over the anchovies to cover.
3. On each of 4 plates, place a mound of 2 to 3 tablespoons ricotta. Drizzle a pool of oil around and over the cheese. Season the oil and ricotta with salt and pepper. Lay an anchovy fillet over each mound. Serve with toasted bread. *Serves 4. Adapted from Antonio Madaio of Casa Madaio in Eboli, Italy.*

Marinated Anchovies

Fresh anchovies
Sea Salt
White wine vinegar
Oregano
A few clove garlic, sliced
Red pepper flakes.

1. Clean the anchovies by pinching off the head. Remove the dorsal fins and fins under the belly. Using your thumbs, pierce through the belly to slit the anchovy into two fillets. Remove the guts and the backbone.
2. Lay the anchovies flesh side up on a sheet pan and sprinkle them with salt. Refrigerate for 48 hours.
3. Drain off the accumulated water, then cover with the vinegar for 2 to 3 hours. Rinse off the anchovies, pat them dry and let them dry overnight in the refrigerator. Sprinkle with the oregano, garlic and red pepper flakes to taste. Cover in olive oil. *Adapted from Donatella Marino, the chef at A'Tartana.*

Pasta With Anchovies and Spinach

Salt
1 pound penne rigate
1/3 cup extra virgin olive oil
2 garlic cloves, minced
1⁄2 cup (about 10 ounces) frozen spinach, drained and finely chopped
6 or 7 anchovy fillets, rinsed and patted dry.

1. Bring a large pot of salted water to a boil. Add the pasta, stir and cook until tender but still firm to the tooth, about 10 minutes.
2. Meanwhile, heat the oil in a large saucepan over medium-high heat. Add the garlic and cook until it just starts to brown. Add the spinach and anchovies, lower the heat to medium, and mash the anchovies with a fork until they disappear into the spinach. Remove from the heat.
3. Set aside about 1 cup pasta water and drain the pasta. Return the spinach to high heat and add the pasta. Toss to combine. Add a few tablespoons pasta water to loosen. Taste and season with salt and pepper. Serves 4 to 6. *Adapted from Mimmo Rambaldo, a former chef at A'Tartana.*

NOTE: salted *menaica* anchovies keep best when the juices rendered from the salting process seal in the moisture. Eat them immediately after cleaning.

Spaghetti With Fresh Anchovies

18 fresh *menaica* anchovies
8 to 12 ounces Spaghetti
1/4 cup extra-virgin olive oil
6 cherry tomatoes, halved
1/2 red onion, thinly sliced
A handful of parsley
Salt.

1. Clean the anchovies by pinching off the head. Remove the dorsal fins and fins under the belly. Using your thumbs, pierce through the belly to slit the anchovy into two fillets. Remove the guts and the backbone.
2. Bring a large pot of water to a boil. Add enough salt so that the water tastes salty. Bring back to the boil and stir in the spaghetti. Cook until al dente.
3. Meanwhile, heat the oil in a large skillet over high. Add the onion and cook until translucent, about 4 minutes. Add the cherry tomatoes and press they with a fork, then add the anchovies and parsley. Keep warm.
4. When the pasta is al dente, transfer the spaghetti to the skillet using a slotted spoon or spider and toss. Add a little pasta water to loosed and simmer to the desired consistency.
Serves 3. Adapted from Mimmo Rambaldo, a former chef at A'Tartana.

Anchovies Stuffed With Ricotta

Canola oil
3 cups ricotta
2 eggs
1 tablespoon parsley
3 teaspoons fine sea salt
Several fresh anchovies
Flour.

1. Fill a large pot with enough oil to rise at least 4-inch up the side of the pot. Set over high heat and bring to 375 degrees. In a large bowl, mix together the ricotta, eggs, parsley and 1 teaspoon of the sea salt until well combined.
2. Clean the anchovies by pinching off the head. Remove the dorsal fins and fins under the belly. Use your thumbs to pierce through the belly and open the fillets like a book. Remove the guts and the backbone. Cover the flesh side of one whole anchovy with about 1 to 2 tablespoons of the ricotta mixture. Top the mixture, making a sandwich, with a second anchovy, flesh-side down. Combine about 11/2 cups of flour with the remaining salt. Dip each anchovy sandwich lightly in the salted flour and deep fry until bronze. *Adapted from Donatella Marino, the chef at A'Tartana.*

Polpettine di Alici (Anchovy Fish Balls)

Several fresh anchovies
11/2 to 2 quarts old bread
6 eggs, beaten
1 tablespoon salt, plus more as needed
1/2 cup finely chopped parsley
2 garlic cloves, minced
1 to 11/2 cups finely grated Parmesan
Tomato sauce.

1. Clean the anchovies by pinching off the head. Remove the dorsal fins and fins under the belly. Using your thumbs, pierce through the belly to slit the anchovy into two fillets. Remove the guts and the backbone.
2. Submerge the bread loaves in cold water. Once saturated, squeeze the water out and bread into breadcrumbs. Measure the breadcrumbs. Portion out have the amount of anchovies as there is breadcrumb. Cut the anchovies into 1/2-inch pieces.
3. In a large bowl, combine the egg, salt, parsley, garlic and Parmesan. Pour this mixture over the breadcrumbs and toss to combine. Gently mix in the anchovies. Roll the mixture into 11/2-inch balls. Lower the fish balls into the tomato sauce and simmer over low heat until the sauce is fish flavored. *Adapted from Donatella Marino, the chef at A'Tartana.*

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