RARE SHELLFISH.

BY ARTHUR INKERSLEY.

Though the flesh of the abalone is a nutritious and wholesome article of food, highly esteemed by the Chinese and Japanese, few people in the United States know anything about the abalone, except that it has a large shell with a bright, pearly interior. The abalone is a gigantic sea-snail, whose natural home is the deep water off a rocky coast. The whole coast of central and lower California, from Cape Mendocino to Cape St. Lucas, abounds in abalones, the supply being absolutely unlimited. As fast as an area of fishing ground is depleted it is repeopled by full-grown abalones coming in from the ocean. Three months after a piece of ground has been thoroughly cleared by the abalone fishers, the supply is as abundant as ever.

The contents of a large abalone shell weigh as much as two pounds, and the value of the meat as a wholesome and digestible food was long ago discovered by the Chinese and Japanese. The supply of abalones in Chinese waters is, however, small, and the fishing grounds off the coasts of Japan were so heavily drawn upon that they became exhausted. The people are forbidden by an imperial edict from taking them. The Japanese and Chinese in California dive for the abalones, which crawl about the rocks at the bottom of the sea in deep water outside the surf. The divers bring them ashore, and spread them out in a sunny place to dry. The drying process reduces the abalone to about one-third of its original bulk, leaving a tough, horny product. The dried abalones are sent to the Orient, where they are soaked and stewed, or ground into powder and used for making soup. The Japanese have improved this primitive method of treating the abalone. They cut the flesh from the shell while the creature is still alive, boil it, and can it in the same manner as clams or oysters. But even this method, though quicker and better than the sun-drying process, is crude and yields a tough product.

DRYING ABALONES FOR SHIPMENT TO THE ORIENT.

A few years ago some Americans, whose attention had been drawn to the large quantities of dried abalone exported to China and Japan, attempted to discover a process whereby the flesh of the abalone could be rendered soft and palatable. The abalone lives in the pure, deep waters of the ocean, and is a clean feeder, so that its flesh is always sound and wholesome, being superior in this respect to that of oysters and clams, which live near shore and are often contaminated by sewage and other impurities. The viscera, or entrails, of an abalone, unlike those of the clam or oyster, which must be swallowed whole, are quite separate from the muscular or edible part, and can be detached by a single stroke of a knife. The flesh, however, when simply boiled, no matter for what length of time, becomes hard and horny. After many experiments, a San Franciscan named J. W. Gayetty discovered a process whereby the flesh of the abalone is rendered soft and succulent like that of an oyster. He is now the president of a company operating a cannery fully equipped with every requisite for the preparation of abalones as food. The cannery is situated at Cayucos, in San Luis Obispo County, California.

For the purpose of gathering the abalones there is a large number of roomy, seaworthy boats, each of which carries two Japanese divers, one of whom goes down for three or four hours and is then relieved by the other. The diver tears the abalones, with the moss and seaweed attached to them, from the rocks on which they live, sending up the shells in baskets as rapidly as possible. Under ordinarily favorable conditions, a diver can send up to the surface a ton of abalones in an hour. As soon as the boat reaches land, the abalones, if not wanted at once, are thrown into a big tank of salt water, the bottom of which is made to resemble the floor of the ocean as much as possible. There they are kept until wanted at the cannery.

The flesh and juice of the abalone are treated together, the resulting product having a flavor more delicate than that of the oyster. It can be fried, stewed, or used in fritters, while the juice makes an excellent soup or a good appetizer. Though the flesh and juice are the most important portions, no part of the abalone is wasted. The viscera, or entrails, yield glue of a high quality, and the shells are a valuable commercial product. The pearl button trade depends largely on the nacreous material on the inside of the shell, from which cuff buttons, knife handles, inkstands, paper cutters, candlesticks, and curios are manufactured. The shells are used for these purposes on the Pacific and Atlantic coasts, and are also exported to Europe, their value being from $35 to $135 per ton, according to quality. Sometimes pearls are found in abalone shells, and for these a premium is paid to the men. A great quantity of canned abalone is sent to China and Japan, where it is a favorite article of food. Dried abalones fetch from 11 to 15 cents per pound. The leading hotels and restaurants of San Francisco now have abalone chowder as a regular item of their bills of fare.

The rock oyster is found only on the coasts of Spain and of Oregon. At Yaquina Bay, a favorite summer resort of Oregonians, digging rock oysters is a regular pastime. In the early morning, before the sun is high, crowds armed with picks and shovels wend their way to the famous rock-oyster beds. Prof. Condon, the State Geologist of Oregon, says of the rock oyster:

"Its scientific name is Pholas. Like all bivalves, it has right and left valves, each having on its middle portion a triangular, rasp-like valve. It is this rasp-like organ that enables it to excavate and keep its burrow open. The rasp is not hard enough of itself to cut the rock, but the hard quartz sand that rests in the folds of the rasp gradually wears away the stone as fast as needed, corresponding with the growth of the oyster. When the eggs are hatched in the seawater, they look like small patches of jellyfish, and for several days swim about with the outlines of their future shells forming slowly about them. By instinct each looks for a vacant spot on a rock-surface, and when found he backs against it and goes into business. They are preferred to all other bivalves for the table, and, as they are found only in one place on the coast of Spain and at Yaquina, they are an unparalleled attraction."

DIGGING FOR ROCK OYSTERS AT YAQUINA BAY, OREGON.

The cruiser "Galveston," on her trial trip, maintained an average speed of 16.56 knots for four hours.

Mining in the Grand Canyon.

BY ALLEN DAY.

The Grand Canyon of the Colorado is so closely associated with the barren country of the Southwest that its possession of valuable mineral resources is comparatively unknown. As a matter of fact, however, the erosion which has been continuing for centuries on such an enormous scale has brought to the surface indications of metal which are familiar to merely the few prospectors who have explored the Canyon. The most notable deposit of this kind thus far discovered is copper ore. A mine is now in operation on what is known as the Grand View trail, which is undoubtedly one of the richest in the world. The existence of the deposit was known over ten years ago, and at one time the famous Buck O'Neil owned the claim. Little work in the way of development was undertaken until recently, when an organization known as the Canyon Copper Company exploited it on a scientific basis, with the result that ore was found which actually assays 75 per cent carbonate, being largely of the malachite variety.

The mine is situated in a formation over a thousand feet below the rim and in one of the buttes or pillars in proximity to the southern side of the Canyon. It is found in porphyritic rock and is what geologists might term a thrust. The ore lies in such a position that it can be readily reached by lateral openings, and an opportunity has been given to make a very thorough examination. So extensive is the deposit that in places the width is no less than 500 feet. It is found in quite a variety of forms, largely in sulphates, although grains of pure copper are frequently secured in mining.

As yet the ore is extracted almost entirely by hand labor, and while enough of it has been taken to the smelter to determine its commercial value, the bulk of it has thus far been placed in the stock pile. Owing to the location of the mine the modern method of transportation as yet has not been employed, and that followed in South America and Mexico and some other countries is in vogue—packing the ore intended for the smelter to the rim on the backs of burros. As may be imagined, this is a very expensive process, but the richness of the ore is such that it can be procured in this manner, transported to the nearest railway which is fourteen miles distant and hauled by rail to the city of El Paso—615 miles—and the large profit realized from the metal obtained. The plans of the company contemplate the construction of an aerial tramway or telpherage system, as a source of electric power is available from a water-course which flows through one of the branch canyons into the Colorado. The volume of water and descent of the river itself near Grand View are so great that ample power could be secured, but the rise in flood time in the Colorado is so rapid and of such dimensions that it is questionable if a dam could be built which could withstand the enormous pressure.

The Canyon Copper Company is composed of capitalists from New England and from the town of Flagstaff, Arizona. The miners it employs are Americans. It is an interesting fact that they are practically the only human beings who permanently reside in the Grand Canyon, their settlement being located near the entrance of the mine on a plateau above the gorge through which the river flows. Old miners who have examined the formation between Grand View and what is known as Bass's Camp believe that very extensive deposits of copper ore exist, but with the exception of the Grand View mine no examinations have been made upon a comprehensive scale. On the north side of the river nearly at the foot of the Grand View trail a deposit of asbestos has been found which contains a high grade of this substance. This deposit is controlled by a New York syndicate and preparations are being made to obtain it. The principal difficulty in getting it out, however, lies in the method of transportation, as it will be necessary to build a cableway across the river, since it would be quite impossible to bridge the Colorado at this point and the current is so rapid that the use of boats is almost out of the question.