

the owner in turn receives. Such fraud as the introduction of cultured pearls, if detected, would bring out the headman's ax, for Arab laws are severe in this respect. But as there are always people willing to make a dishonest dollar or rupee—and the Arabs are certainly no exception—it is inconceivable that cultured pearls, carefully chosen for their similarity to Gulf pearls, have not at times been smuggled into the Persian Gulf. If the Arab merchants cannot detect them, there are probably few experts who could without the aid of delicate and elaborate electrical instruments.

OYSTERS AND OYSTER BEDS

Arab lore in the Gulf relates that the young shell-less oysters come to the surface when it is raining, or when the moon is full. The raindrop is the father of a good pearl and the oyster the mother, while the moon produces luster. A poor season is attributed by many to a shortage of rain. Al-Qazwini, author of *The Wonders of Creation*, gives a different version: the north wind carries a mist containing a viscid substance similar to mercury from the Caspian Sea to the Gulf; the oysters draw in this substance, a large drop forming a large pearl.⁹ But every Arab has his own explanation of the phenomenon, and believes that the true scientific explanation is just fantasy.

According to O'Shea, three types of pearl oysters are found in the Persian Gulf, known to the Arabs as *mahharah*, *zanniyah*, and *sadaifiyah*. The *mahharah* are the commonest, growing to two or three inches in diameter, and producing 98 percent of the pearls found in the Gulf. The *sadaifiyah* is a rare find and seldom yields pearls; it grows to great size (six to eight inches in diameter) and is often collected for its mother-of-pearl. The *zanniyah* is found in the vicinity of the Ras al-Khaymah in Oman; no details of this oyster are given. In the Red Sea two varieties are commonly found: the large oyster, known as the *balbil*, and the small, known as the *sadaf*. The pearl itself is known as *lulu* to the Arabs in the Persian Gulf, irrespective of the species of oyster from which it comes, while the Persians know it as

⁹ A. Rihani, *op. cit.*, p. 277.

mawarid. O'Shea relates that in Oman the pearl is commonly referred to as *qumash*, which is also Arabic for "material" or "goods."¹⁰

Pearl-bearing oysters are found in most of the Persian Gulf waters in depths varying from just below low tide to 20 fathoms. On the Persian side of the Gulf the bottom falls off rapidly to the 50-fathom maximum in the Gulf. On the Arabian side the bottom slopes off gently so that there are extensive areas within the 20-fathom limit. Thus, there are few pearl oysters on the Persian side, although fine pearls have been reported from near Kharaq Island off Bushire, and from Lingeh, but these are exceptions. However, extensive pearl beds are found along the Arabian side, stretching almost continuously for 700 miles from near Ras al-Khaymah east of Sharjah on the Trucial coast, to Ras al-Misha'ab south of Kuwait, the best beds being between 5 and 10 fathoms. The most productive are located to the north and east of Bahrein Island; this is probably why Bahrein has been the pearl center of the Persian Gulf. However, Dr. A. E. Alexander, a leading authority on pearls who visited the banks in 1947, estimates that only 35 percent of the Gulf pearls come from around Bahrein Island; the remainder comes from the Trucial Coast and from the banks near Kuwait.

The success of any pearling season seems to be as unpredictable as the habits of the pearl oysters themselves; the oyster beds shift periodically so that their exact location is not known until the diving starts. Sometimes the pearls are plentiful and valuable, at other times they are neither. Sometimes a bank is sterile for several seasons; then the next it may yield all the highest quality pearls. None of the banks are charted; each *nakhoda* has his own knowledge of them and his own theories. Arab experts believe that the largest, most dense, and whitest pearls come from deep water, while shallow water yields only low density pearls tinted with some color. Some of the more pessimistic Arab observers claim that the Persian Gulf fisheries never yield over two first-quality necklaces in any one season.

¹⁰ Raymond O'Shea, *Sand Kings of Oman* (London, 1947), p. 133.

THE PEARLING FLEETS

The bulk of the main pearling fleets sticks together, the Kuwait fleet moving down the coast while the Bahrein fleet moves up. The pearlers of the Trucial Coast follow the banks from Ras al-Khaymah to Qatar, a straight-line distance of over 400 miles. The Oman pearlers never go above Halyl Island; they work various areas around the islands in small fleets of 10 to 20 boats, the smaller vessels usually working the grounds nearest their home ports. A pearler assumes a position on the edge of a bank so that by paying out anchor line it will drift across the bank. When the divers begin to bring up only a few oysters, the boat is allowed to drift to a new position. After it has worked completely across the banks, the crew moves it back with the sweeps, to chants and drum beating. It is here that the true skill of the *nakhoda* comes into play — to keep his ship over virgin beds. When day ends the large ships stay on the beds and the crew settles down for the night; the smaller ships usually make for a protected anchorage.

Estimating the number of dhows and men employed in the Persian Gulf pearl fisheries is similar to estimating the population of the Arabian Peninsula. The published figures are largely based on Arab guesswork; most of them are probably much too high. Registers of a sort are kept in every town and port along the coast sending boats to the fisheries, so that figures do actually exist. But these are not published, and an accurate count would necessitate a survey of the whole long Gulf littoral.

In one of the earliest European references to pearling in the Persian Gulf, Niebuhr states that in 1763 the inhabitants of Kuwait lived by the fishery of pearls and fishes, and were said to employ more than 800 boats in these tasks.¹¹ Over half a century later, Wilson estimated that the pearl fishing boats on Bahrein amounted to about 1,500.¹² In a short account of pearling on the Trucial coast, Whitelock states that in the 1840's there were said to be something over 3,000 boats in the Gulf fisheries.¹³ Whitelock adds that the smallest boats had 5 men and the

¹¹ Carsten Niebuhr, *Travels Through Arabia* (Edinburgh, 1792), p. 127.

¹² D. Wilson, *op. cit.*, p. 285.

¹³ H. H. Whitelock, "An Account of the Arabs of the Pirate Coast," *Trans. Bombay Geographical Soc.* I (1844), pp. 42, 45.

largest about 18; but as the smaller boats were the more numerous, he used 9 as an average to arrive at a total of 29,000 men employed in the pearl fisheries.

Zwemer estimated the number of pearling boats out of Bahrein in 1896 as about 900, those out of Qatar as 200, and total number of boats as 5,000, employing 30,000 men.¹⁴ However, the figure of 900 does not seem to justify the total of 5,000; since Zwemer lived on Bahrein Island the figure of 900 would seem to be the more accurate. Zwemer is apparently responsible for the figure of 5,000 dhows in the pearl fisheries which has appeared in print so frequently since: Villiers and Simpich state that there were 5,000 boats at the turn of the century, employing 80,000 men,¹⁵ while O'Shea states that in normal times there are about 5,000 boats employing 74,000 men.¹⁶

Evaluating these estimates and others not mentioned, one is led to the conclusion that there were never over 3,000 boats engaged in the Persian Gulf pearl fisheries, and probably not over 40,000 men. Taking the figures that may be considered as relatively reliable, we arrive at the following average for the fleet during the boom years:

Bahrein (Zwemer)	900
Kuwait	600
Qatar (Zwemer)	200
Eastern Arabian ports.....	200
Trucial coast (Whitelock).....	700
Persian ports (Whitelock).....	100
	2,700

This figure would seem to be a fair estimate for the size of the pearling fleet at the turn of the century, and if anything is on the high side

The first few decades of the present century were the last prosperous years that the Gulf pearl fisheries saw. Whereas, at the turn of the century there were almost 3,000 boats engaged in the fisheries, today there are hardly one-fifth that number. An

¹⁴ S. M. Zwemer, *op. cit.*, pp. 100-101.

¹⁵ Alan Villiers, *Sons of Sinbad* (New York, 1940), p. 373; Frederick Simpich, "Rise of the New Arab Nation," *National Geographic Magazine*, vol. 36 (1919), p. 388.

¹⁶ R. O'Shea, *op. cit.*, p. 132.

estimate of the number of boats operating in 1946 would be as follows:

Bahrein	150
Kuwait	100
Darin, Qatif, Jubail.....	30
Trucial coast, Qatar, and Persian ports.....	250
	530

Manning these 500-odd craft were probably not over 10,000 men.

In Oman a strange balance of labor has been set up by the coincidence of the pearling season with the date harvest. Starting about June there is a migration of men northward from the Batinah Coast to the Trucial Coast; these men work the pearl fisheries. Some go north in caravans, others sail up in their *bedens* and other dhows. Opposed to the flood of men who make this temporary migration is a counter-migration of women who move southward from the Trucial Coast to the Batinah Coast; these women are hastening to the date groves for the date harvest. Often the women journey southward on the caravans which are returning from carrying the men to the Trucial Coast. Several months later, in September, the journeyers start the return home.

Bertram Thomas states that a considerable percentage of the army of men annually migrating northward to the Trucial Coast is composed of slaves.¹⁷ These Batinah contingents are usually accompanied by a tribal agent who enlists them with some pearling *nakhoda*. The slaves are the best divers, as they have been at it from youth; freemen usually work the ropes in Oman. Slave divers are noted for their lack of fear of diving into deep water or into muddy water containing weeds. So great is the need for labor in the Trucial pearleries that boats sail into the Gulf from as far away as Socotra to join the pearl fishing.¹⁸

Pearl fishing is a seasonal occupation, as the divers must wait for warm summer water before starting to dive. Probably few people realize there is a winter in the Persian Gulf, and that the water gets so cold that swimming for periods of over five minutes is extremely chilling. In Hasa Province it is not uncommon

¹⁷ Bertram Thomas, *Alarms and Excursions in Arabia* (London, 1931), p. 238.

¹⁸ *Ibid.*, p. 143.

for the minimum winter air temperature to be in the middle forties; during this period the sea water temperature in shallow water will be in the low sixties.

Pearl diving requires that the diver's body be almost continually in the water. From experience the Arabs have found that the surface water temperature has to be about 85° F. before continued deep-water diving is feasible; thus the main pearling season (*al-ghaws al-kabir*, or "great diving") averages four months—from June into the first week of October. During this time the maximum surface water temperature exceeds 90° F. (in August) off Hasa. O'Shea states that on the Trucial Coast *al-ghaws al-kabir* often lasts until late October, the water apparently remaining warmer longer there than further north.¹⁹ In addition to *al-ghaws al-kabir*, there are two other seasons: the "cold diving" season (*al-ghaws al-barid*) running from April to May, and the *mujannah*, running from October to March. The smaller boats run out in the shallower (warmer) waters for *al-ghaws al-barid* and act as a barometer for the season, while the *mujannah* is worked by waders who work along the shore when the tide is out, many equipped with glass-bottom "look boxes."

For *al-ghaws al-kabir* the various fleets, whether from Kuwait, Bahrein, or the Trucial Coast, leave port en masse with flags flying, to the beating of drums and Arab chants. The few boats from the smaller ports slip out without fanfare. It is a stirring sight to see these fleets of dhows maneuver with their sweeps and then set forth under huge spreads of lateen sails, with their freshly oiled, burnt-brown hulls glistening across the aquamarine water, like some ancient Phoenician or Roman fleet.

An admiral represents the pearl fishing fleet of each port. It is the admiral's boat which leaves the port first, and the admiral's duty to determine when the water becomes too cold for continuous diving. It is considered improper (by the owners) for the *nakhoda* of any large vessel to leave the pearl banks before the admiral leaves.²⁰

¹⁹ R. O'Shea, *op. cit.*, p. 137.

²⁰ The admiral of al-Khobar, Saudi Arabia, now works for the Arabian American Oil Company, for al-Khobar no longer sends vessels out to the pearl grounds.

DIVING TECHNIQUE

The rights to the Persian Gulf pearl fisheries are jealously guarded by the Arabs, and these rights have been backed up by the British Government for over a hundred years. They are limited to the inhabitants of the Gulf littoral—Arabs and Iranians. Pearl diving in the Persian Gulf is carried on without the use of any professional diving gear; it is "skin diving." The British have prohibited drags, dredges, and compressed air diving suits or helmets, and there is a 30,000 rupee (\$9,000) fine for violation of the law.

However, in spite of this protection, foreigners have dived for pearls in the Gulf, and diving equipment has been used. In 1882 a Bombay syndicate sent a steamer, the *Johnstone Castle*, without official permission to the Bahrein banks. After five days the vessel was arrested by a British gunboat; its yield had been only 23 seed pearls.²¹ During the pearling season of 1935 some Italians employed by the Qusaibi Brothers, wealthy merchants of Hofuf, Saudi Arabia, used deep-sea diving suits.²² Presumably these merchants figured themselves exempt from British proclamations, inasmuch as they were Arabian nationals. But nothing more was ever heard of the venture, so it was either not a financial success or else the British brought pressure to bear against the practice. The Arab customs officials of both Saudi Arabia and Bahrein Island have been extremely suspicious of oil company divers, who spend a lot of time under water inspecting pipelines and piers, and they used to watch them through field glasses to see that they never brought up any oysters.

The maximum depth at which the divers work is about 12 fathoms.²³ Sweeps are left projecting overboard athwartships and are lashed to the tholepins and the deck. The divers' lines pass over the sweeps so that they will not become fouled. To get to the bottom a diver puts his foot in a loop of rope tied to a stone or iron weight, releases a slip knot holding the rope to the sweep, and holding onto the rope plummets down. The attendant pulls up the stone as soon as he feels it hit bottom. The diver holds onto

²¹ R. O'Shea, *op. cit.*, pp. 140-41.

²² K. S. Twitchell, *Saudi Arabia* (Princeton, N. J., 1947), p. 26.

²³ A. Villiers, *op. cit.*, p. 374; Hugh Smith, "The Pearl Fisheries of Ceylon," *National Geographic Magazine*, 33 (1912), p. 174; R. O'Shea, *op. cit.*, p. 137.

another line to which is tied an open-weave palm leaf basket for the oysters; sometimes the diver has the oyster basket tied to his waist or around his neck and has the line tied to his body. When the diver is ready to come up, he gives several tugs on the rope. Thus the diver does not have to waste his valuable energy in swimming up or down. When he first reaches the bottom, he attempts to go out perpendicularly from the boat, frantically plucking all the oysters he can see before his air gives out. The diver usually crawls on one hand and one foot, using the other foot to propel himself and his free hand to collect the oysters.

The divers wear a horn noseclip similar to a clothespin; this keeps the water out of their noses and enables them to hold their breath longer. Sometimes a diver will stuff cotton or beeswax into his ears to keep the water out. A set of leather finger thimbles protects his fingers from coral and other sharp objects; he wears only a loin cloth. This is the equipment universally used in the Persian Gulf, whether the diver is out of Kuwait, Bahrein, the Trucial Coast, or Persia. These divers wear no goggles and many have impaired vision from trachoma, so their efficiency is cut down considerably. It is strange that the Arabs have not added at least eye socket goggles, which the South Sea Island and Philippine pearl divers have eagerly accepted.

Alan Villiers states that the Kuwait pearl divers make ten consecutive dives and then rest while a "substitute" makes ten; these two divers have the same attendant.²⁴ Divers in other parts of the Gulf work continuously, taking a rest all together at certain predetermined times, sometimes corresponding with prayer-time.

The diver stays under about a minute, then rests for two or three.²⁵ Ten dives would consume about three-quarters of an

²⁴ A. Villiers, *op. cit.*, p. 392.

²⁵ The average length of time that a diver stays under water has long been a controversial question. Alan Villiers (*op. cit.*, p. 392), who spent two months with the Kuwait pearling fleet, states that the divers averaged about a minute, ranging from 40 to 90 seconds. O'Shea (*op. cit.*, p. 137), spending some time among the Trucial coast pearl divers, states that divers there remain under water from 40 to 75 seconds, also averaging about one minute. Whitelock (*op. cit.*, p. 43), who visited the Trucial coast pearl fisheries one hundred years ago, stated that the divers averaged about 40 seconds under water, but that he never saw them remain over a minute. Hugh Smith (*op. cit.*, p. 183) states that in the Ceylon fisheries the Arabs are the best divers, staying down from 60 to 75 seconds, with a normal maximum of 90 seconds, and that there is an authentic case of an Arab staying under 109 seconds in seven fathoms of water. In any

hour, after which time the Kuwait diver is dragged out of the water and huddles in some spot on the ship looking more dead than alive. He may average four shifts a day, making a total of 40 dives; O'Shea states that under excellent conditions the Trucial divers average 50 dives a day.²⁶ During this time he has spent almost one hour under water. Ten dives are not difficult, nor are 50 excessive in one day for anyone experienced; but day after day and week after week the diving goes on—for four months. When the season is over, the diver has weathered the impossible; he has probably completed over 3,000 dives in from 30 to 50 feet of water, and has spent over 50 hours under the surface of the Persian Gulf—that is, over a full forty-hour week without air, valiantly striving to gather all the oysters he can see through his blood-shot and irritated eyes, which become less sensitive with each dive.

Every ten days or so the divers do get a day of rest, and if the *shamal* is blowing they have to wait it out, as it roils the water. Occasionally they have to go ashore to bury a diver who fails to complete his 3,000 dives. It is not surprising that there are one or two empty stations on each boat; their occupants lie huddled corpse-like under their cloaks in some part of the ship, too sick from scurvy or plain fatigue to dive. After they have been at it for many weeks, the divers are apt to get convulsive shivers when they come out of the water for their rest, even though the temperature may be 110° F. and their tenders are covered with a lather of sweat. There are few, if any, white men who could endure just one day of such punishment; the Arab could not either except for his belief that Allah is merciful and that a Paradise awaits him.

Every dhow has to put in for water and food every three weeks or so. In recent years the pearling fleet has used the oil company's pier at Ras Tanura for water, but vessels have been known to replenish their water supply from some of the submarine springs which gush into the Persian Gulf. A diver goes down with an empty skin and opens it in the potable stream; he can bring up fairly fresh water by this means. One of these submarine springs,

case stories one hears about the amazing power of the Arabs to stay under water from 5 to 10 minutes or more are absurd.

²⁶ R. O'Shea, *op. cit.*, p. 137.

located a few miles north of Jubail, has been marked by a spar buoy by order of King Ibn Saud.

O'Shea states that while the divers on the Trucial Coast are rarely attacked by sharks, about 30 were attacked and two killed around 1940.²⁷ Whitelock states that the Arabs claimed that the danger of sharks was ever present, but that their worst fear was from the saw fish, which had been known to cut divers completely in two.²⁸

Rihani writes that what the Persian Gulf pearl diver dreads most is the *dawl*. However, he apparently does not realize what the *dawl* is, merely quoting Sheikh Khalifah ibn Muhammad al-Nabhani's *History of Bahrein*: "The *dawl* is a semi-fluid animal, about the size of a man's hand, round in shape, with a multitude of tendons about two feet in length, resembling a network of silk. It has no power of locomotion, but is driven by the waves and currents hither and thither. If it comes in contact with the body of man, it burns it, leaving a deep scar; and if it is lifted out of the water and left in the sun for five minutes, it dissolves."²⁹

The zoologist will immediately recognize this description of the *dawl* as a jellyfish. It is in fact a small bell-shaped jellyfish with two to three foot-long tentacles. The *dawl* swims at any level and is practically invisible underwater; thus the divers cannot keep away from the stinging tentacles, which will burn the body and can put out an eye. Along the Ras Tanura peninsula, the *dawl* is most often seen near the surface shortly before flood tides.

There is a species of needle urchin (*Diadema*) in the Persian Gulf with spines from one or two feet long.³⁰ It is known that these spines will produce nasty slow-healing wounds if bumped into under water. This urchin may be the cause of some of the open sores on the divers' legs, although salt water alone could cause them, for the Persian Gulf has the highest salt content of all the ocean bodies, and constant immersion in salt water is known to produce a rash. However, as the *Diadema* is black and several

²⁷ *Ibid.*, p. 138.

²⁸ H. H. Whitelock, *op. cit.*, p. 43.

²⁹ A. Rihani, *op. cit.*, p. 280.

³⁰ *Diadema* was first reported from the Persian Gulf by this author: A. H. Clark and R. LeB. Bowen, Jr., "Echinoderms of Saudi Arabia," *American Museums Novitates*, No. 1390 (1949).