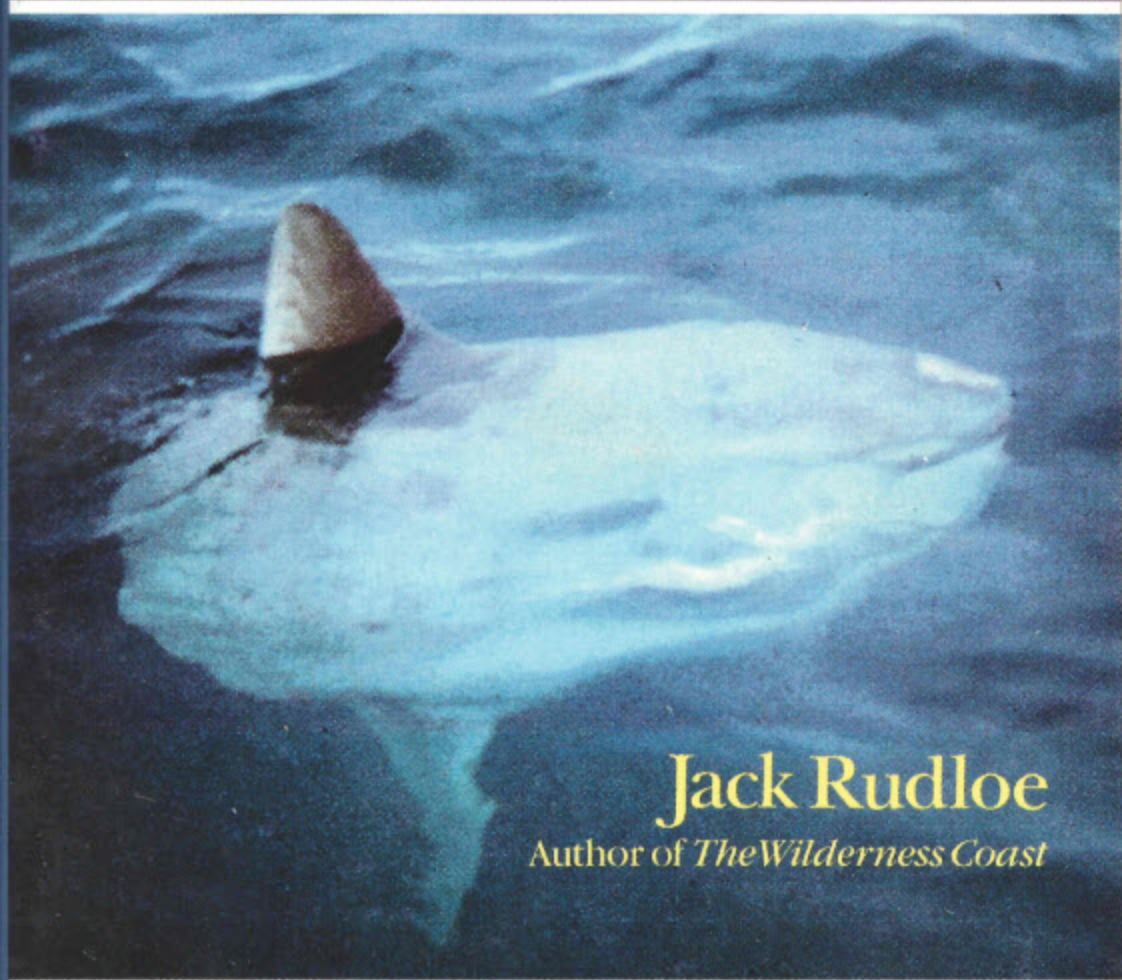


THE SEA BRINGS FORTH



Jack Rudloe

Author of *The Wilderness Coast*

6 Potluck



In the evenings I worked on my forthcoming catalogue. Since I was determined to expand the business the catalogue was of prime importance. It had to be attractive—well written and designed. It was due to go to press in six weeks, because I had to allow enough time for the universities and schools to plan their summer and fall research and teaching programs.

I was listing only the largest and most prevalent species of nudibranchs, the more conspicuous barnacles and crabs, the most abundant and easily obtained marine fish. I listed only the animals I was reasonably sure I could collect when they were ordered. And it was not easy, not by a long shot. How could I make *Pennaria* hydroids come alive and mean something? In a world of jumbled scientific terminology and new terms being evolved faster than chicks in a hatching factory, I found everyday English more satisfactory. I wanted an inland instructor who had never been near the seashore to have an idea of what *Pennaria* really looks like.

Under a dissecting scope the polyps of *Pennaria tiarella*

look like clusters of innocent snapdragon flowers. Their movements are snakelike, swaying and nodding. Then when some unsuspecting little planktonic creature seeks shelter or food among the lovely white petals, it gets stung to death and digested. In summer *Pennaria* becomes even more beautiful and strange. It sprouts pink, oval-shaped medusae buds alongside the polyps, and when full with ripeness, they break away and float gently out to sea with the ebbing tide.

Of course all this could not be put into a catalogue. It had to be condensed, like a telegram. So I pretended to myself that each extra word cost a dollar. I had to reduce *Pennaria* to these inadequate words: "A bright pink hydroid. Medusae buds develop alongside the hydranths. Available April through October." And then their price.

In the catalogue I also featured special package deals, economical shipments which were based on realistic collecting. It simply meant that when I went collecting on a tidal flat, or went skin diving, I filled my buckets with a variety of animals that were abundant that particular morning. The beach and shoreline is always changing—each season has its callers and visitors. One spring morning the Portuguese man-of-war may be blown ashore and piled up on the beaches. Pelagic sea slugs which inhabit floating sargassum weeds may be available one day and gone the next. And one day during the winter the tide flats may be full of the great orange polychaete worm *Lysarte brasiliensis*, oozing and sliding through sand that was barren just a week before. Just as suddenly *Thyone mexicana*, the thin-skinned sandy sea cucumber, is found everywhere.

There are the old reliable residents that stay around through the seasons whether it is hot or freezing. On the low tide while I was filling my buckets with such basics as moon snails, crown conchs, starfish, sea cucumbers, and sea squirts I could always pick up the sporadic visitors for my package-deal collecting order. If an unusual nudibranch slug, common in the Caribbean,

floated up to the northern Gulf, the students whom I supplied might have an opportunity to watch the graceful animal waving its plumed fronds, folding and opening its blue-and-orange-spotted skirts like a ballerina, as it glided across the floor of the aquarium.

And on this same day while I was picking up clusters of red-beard sponges, or digging up acorn worms, I might come upon the leathery tube of the scale worm. I wanted the instructor and his students to share the experience I had with this animal when I first found it.

I shall never forget slitting open the tough, leathery tube and watching in amazement as the largest scale worm I had ever seen slithered slowly out. I felt as astonished and transfixed as Aladdin did when the genie rose slowly and enormously out of the lamp. The long, long worm slowly came out with a snake-like movement, covered with mucus and slime, and slid into the pan of seawater. I had mixed feelings toward this worm. It was almost dragonlike, and there was something repulsive about it. Like the mythical dragon it had scales. There were two rows of armored, blue-tipped, brown-spotted scales that seemed to have a waving movement of their own on twelve inches of sinuous, writhing worm, and the head was crowned with snake-like tentacles that moved in rhythm with the rest of the worm. It was horrible-looking, yet looking at it in another way I saw a deep beauty in its colors and rhythm.

If the students, following my instruction sheet, observe the scales closely, they may see something even more surprising and fascinating. Under the scales, adhering to the worm's body, may be a number of small reddish snails no bigger than the tip of a matchstick. Their shells resemble a flat, coiled-up spring. These are *Cochliolepis parasitica*; they are in the same class of gastropod mollusks as the heavy-shelled whelks, the gaudy, lively tulip shells, and the crown conchs

found foraging on the beaches, oyster reefs, and tide pools, devouring clams and each other.

The moon snail, slowly traveling under the damp sands with its enormous, slimy, membranous-looking foot, searching for a clam, bumps into another burrowing, hungry snail, the ear shell, and the fight is on. The death struggle ensues until one kills the other by rasping away on the flesh and shell with its sharp radula, a long ribbon of teeth unsheathed from the thrusting, extending proboscis, or each tries to smother its adversary with its overwhelming, expanding foot.

I know who won when I see an empty moon-snail shell washing up on the beaches, and then I think of the tiny parasitic snail who comfortably solved its struggle for existence by latching onto the well-concealed scale worm. These little vitrinellid snails have evolved into the highest form of existence—parasitism. Contrary to popular opinion, parasites are not animals that have degenerated. True, they may have lost the use of certain limbs, but they have developed a more useful organ, like a big sucking mouth or appendages that can dig in and cling; they have evolved above the free-living forms.

I look at the fish copepods with their shrunken legs, grotesque sucking mouths, and long strings of reproductive egg sacks. They have evolved into their highest possible form. Once upon a time they were just ordinary shrimplike creatures who fended and found food for themselves.

I often wonder how we, the human species, will ultimately evolve if we continue making machines and computers our hosts. Will our legs become shrunken from mechanized transportation, and will our heads become grotesquely large and our stomachs swollen?

Now getting back to the fascinating scale worm and its parasites, I had to consider whether I should feature it in my catalogue. More often than not, months would go by before I

happened upon more scale worms. I could institute a search for them, but only on special order, which took it way out of the economy class.

The idea of a packaged assortment had come to me when I

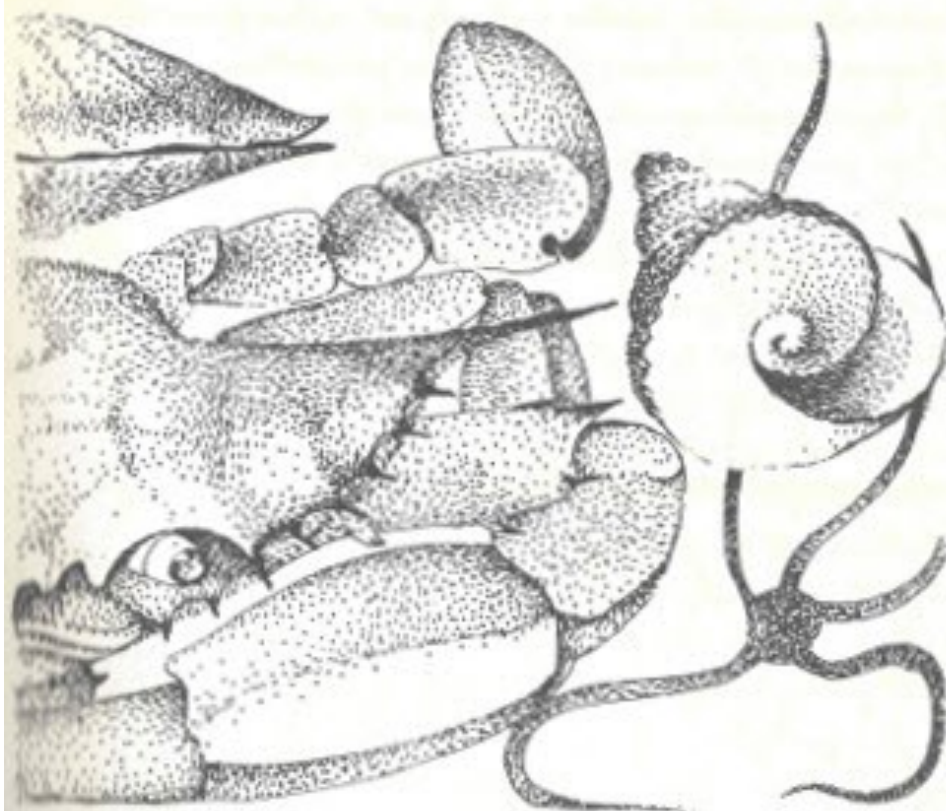


The idea of a packaged assortment had come to me when I was visiting Woods Hole. The instructor gave me a carte-blanche order for an assortment of

was visiting Woods Hole. An instructor of invertebrate zoology who had been teaching his course using embalmed marine animals, colorless and reeking of formaldehyde, found his students dull-eyed and bored. He gave me a carte-blanche order for an assortment of living marine invertebrates that could be

found on the beach at low tide in a single morning's collecting. He felt it was the closest thing to actually taking his students to the seashore to see a live creeping starfish or a moon snail.

A second professor wanted to abandon preserved materials



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entirely, so he asked me to have live animals in phylogenetic order flown up in time to meet laboratory schedules. The first week it was sponges; the second, coelenterates (hydroids, jellyfish, corals, sea anemones, etc.); the third week, flatworms; and so on. Both men implored me to throw in any exotic or

unusual creature like the giant scale worm because they would enjoy looking at it themselves.

The spring mornings in North Florida were thick with fog. The tides were good and low, and one morning I took advantage of it to get up a good collection for the assortment orders. I wanted to get in as much intertidal collecting as I could before the shrimping season really started. The fog drifted slowly over the beach; at times it seemed like I walked into the middle of a cloud. The water was glassy-smooth, and the fog hung like thick coils of smoke over its surface. The rising sun was trying to burn through the thick moisture, which clung to me and to the shrouded trees and palmetto scrub. My vision was necessarily limited, and I could not see very far down the beach. As I walked through the mists I could not help seeing the huge, dying jellyfish *Rhopilema verrilli*, some of them as big around as washtubs, stranded by the outgoing tide.

They are Southern jellyfish that float about in the ocean currents and occasionally drift up to New England. Not much is known about them—where they come from and where they go—but their migrations along the western Florida coasts are consistent. I had seen them year after year during the winter months, but I did not intend to list them in my catalogue. These heavy, massive jellies would be impractical to preserve and costly to ship, and they were too large for any normal aquarium. Small specimens of *Dactylometra quinquecirrha* were more popular and more suited for classroom study. They had been in last week, and I was hoping to find a few stragglers for the assortment order.

However, as a collector, I filed away in my mind the seasonal occurrences of *Rhopilema*, because a few were infected with a small, interesting parasitic pink sea anemone. Also, someday a biochemist might need a large volume of medusa tissue to make a protein or mineral-salts analysis. And should

there be a demand for a great mass of frozen coelenterate eggs, I would go in search of *Rhopilema verrilli* immediately.

I picked up four of the smaller live chunks of sea pork that had washed ashore, and then went on looking for live whelks and cockles. This was mollusk week, so Linda was encouraged when she dug up six large Venus clams, *Mercenaria campechiensis*, which make good dissecting specimens. I don't know how she did it—whether she nosed them out or whether she saw their keyholelike slits in the hard-packed sand—but she was good at finding them and blood clams, *Arca umbonata*, which I was always pleased to get because I knew students would be interested in them. When you crack open this clam, you will be shocked to see its bright-red blood trickle down your fingers. I also knew the instructor would be pleased, because he could demonstrate *Arca* as one of the most primitive forms of bivalves.

Linda padded up to me, dropped a whelk at my feet, and waited for my lavish praise. I was too busy to pay any attention to her, because I was laboriously digging up a long pink nemertean ribbon worm, *Cerebratulus lacteus*. To keep it from breaking in two, which would make it useless as a demonstration specimen, I carefully splashed seawater on the shovel and then slowly washed out another six inches of worm from the sand, and then more gentle splashing of seawater, until finally I had all the sand washed away.

I thought wistfully of the Cape Cod region and even Boston Harbor where these worms were so common that fishermen dug pailfuls for bait. Later on when the full summer season was upon us, and collecting slacked off, I was hoping I could go to the Maine coast and get a stock supply of traditional Northern specimens for my customers. These nemerteans were scarce and smaller on the Gulf beaches, but they were always in demand and would serve the zoologist's teaching course.

I decided that there were enough locally to offer them as live specimens in my catalogue.

Linda watched the tedious operation of removing the ribbon worm impatiently. She pitied my slowness and stupidity. If I only left the digging up to her superior ability she would have that silly worm out in no time. So she lunged in helpfully with scrabbling paws and tossed sand and four pieces of the worm into the air. I sat on the sand bitterly contemplating murder and wondering if the shovel would be sufficient. Linda was a sensitive dog; she walked stiffly away, insulted and sulking. I knew when she was sulking because she wouldn't even glance at me.

She pretended she saw something that was far more worthy of her attention. A flock of saucy sandpipers were picking up worms on the high beach. This was irresistible; these brazen birds had to be taught a lesson. And she was off in a flash, her ears flapping back in the wind with the joyful, hilarious look that only Airedales have. The sandpipers seemed to enjoy the chase as much as she did. They flew off screeching down the beach, waited until she bounded up to them, and then flew farther down and back again, with Linda panting and racing until they led her back to me. After an hour of this invigorating exercise, she forgave me and came back to watch me dig for sea anemones.

I happened upon a sand bar where there was an aggregation of the large gray burrowing sea anemones *Bunodactis stelloides*. I proceeded to dig some up for a stockpile and orders. Linda was good at this digging; between us we managed to fill a bucket of slimy, contracted blobs that would flower out later in the seawater aquaria.

Bunodactis stelloides was not a traditional sea anemone like *Metridium*, which is found on wharfs and jetties of the New England and North Pacific coasts. Instructors purchase *Metridium* by the hundreds for routine dissection in zoology

classes. But I had had an uphill job trying to create a market for *Bunodactis*, which was seasonally abundant on the Gulf. After a specialist in the Smithsonian Institution identified my specimens as *Bunodactis stelloides*, I sold a number of them to museums, because once they were officially classified they were a valuable addition to the worldwide collections of anemones.

The first year the sales of these anemones dragged. They didn't pay for the time involved in collecting them until I convinced a physiologist at Harvard to try the live anemone for classroom demonstrations. He became an enthusiastic customer and advertiser for *Bunodactis stelloides* once he learned what an amazing anemone it was.

Unlike the popular North Atlantic *Metridium senile*, which is delicate and has to be kept in chilled aerated water, tough little *Bunodactis* adjusts to any temperature, blooms magnificently in stale seawater at room temperature, and lasts for years. What is more, it makes a superb specimen for demonstrating muscular contractions. When the sensitive *Metridium* is given an electrical stimulus it promptly draws in its tentacles and often remains contracted. It takes hours or even days to expand again, whereas *Bunodactis* just as promptly, draws in its short, stubby gray tentacles but opens up two or three minutes later. Repeated electric shocks do not affect its ability to respond, and it can be used for demonstration over and over again.

Bunodactis stelloides was gaining a reputation, and I was already giving it a special description in my catalogue and planning to have it photographed.

When I was almost finished getting up the live-animal collection from this beach, I turned my attention to the massive, firm jellies lying scattered at the edge of the sea or draped on the rotting pine stumps and began looking for specimens infected with the parasitic anemone. I examined ten jellyfish and found them negative, but on the eleventh I found a number of

half-inch-long pink anemones lodged in the canals. They were definitely alive, because they slowly contracted and stretched in the midst of the firm tissues of the hanging lobes and umbrella.

These anemones were not destined for the beach-potluck order—they were much too valuable. A year before I had sent a sample to a zoologist at the Smithsonian Institution, who identified it as *Calamactis*, a genus of actinian, or sea anemone, known only from the Gulf of California. Was it possible that the specimens from the Gulf of Mexico were a new species? The specialist reported that they were parasitic only in their juvenile stages. But no one knew what they were like in their adult form and where the adults could be found.

I knew almost all the anemones from my collecting locality, and never once had I encountered the adult *Calamactis*. Before the species could be determined, the juveniles would have to be raised successfully in aquaria to adult form. Therefore the actinian specialist had ordered two dozen living juvenile *Calamactis* last year.

But unfortunately, by the time I received his letter the jellyfish were gone. Another year had rolled around, and now the jellyfish were back with the infant parasitic anemones. I dug my fingers into the slimy, firm jellies and flipped the heavy bodies over, looking for more infected specimens. I carefully squeezed out some little anemones into a glass jar filled with seawater and held them up to the light admiringly. They were orange or pink cone-shaped creatures crowned with a ring of blunt tentacles.

All I needed now were two clusters of *Molgula occidentalis*—sea squirts—and my collecting would be finished. I drove to a little sheltered inlet near Elizabeth City where *Molgula* abounded. If all went well the specimens would be on the plane that evening.