

## *Instant ocean: it just keeps rolling along*

**A magic machine makes waves out where there has been no sea for eons—and surfers, like the girl at left, all come to see it and try it**

In the summer of 1967 everybody was hot and testy. By mid-July, in a dozen U.S. cities, rioting in the streets had become a way of life. In Vietnam the same old war dragged on. The Red Chinese were fighting among themselves. In Africa the Congolese brought their old civil war back to a full boil, and in the Near East the Arabs and Israelis concluded a Six-Day War and kept on shooting. In Montreal, Charles de Gaulle proclaimed that Quebec should be France-West and in Havana, Stokely Carmichael declared that the United States was run by white mice.

During that endless summer, when a great many people were making waves out of nothing, in a bankrupt pool hall in Phoenix, Ariz., Phillip Dexter, age 40, was using plain tap water to create five-inch ripples. The abandoned pool hall where Phil Dexter made his ripples was located in the civil riot district of Phoenix. On several riotous nights snipers used the roof of the pool hall, but because the plate-glass windows were papered over they were not aware that Phil Dexter also was making waves one floor below. That, of course, was fortunate, for nothing spoils a secret small-wave operation so much as when bigger wave makers start throwing fire bombs through the windows.

Although Dexter made only small waves, he made a hell of a lot of them—in that mad summer he is probably the only man who made more than 60,000 waves without attracting any attention. First Dexter created his secret mini-waves in a rather hit-or-miss fashion in a narrow sloping vat two feet wide and 30 feet long. By the end of the summer, at the flick of a switch, he was turning out waves automatically in a miniature lagoon that was 40 feet by 30 feet and held 1,000 gallons of water. When Dex-

ter hit the switch of his automatic wave maker in the pool hall, two pumps began filling a reservoir that rose vertically at one end of the miniature lagoon. Inside the reservoir there was a toilet float. When the pumps raised the water in the reservoir 17 inches above the level of the miniature lagoon, the toilet float actuated a switch that opened an underwater gate for a sliver of a second. Each time the gate opened, splut, a five-inch wave would emerge from the base of the reservoir, roll across the lagoon and spend itself, frothing and singing, on the far shore.

Splut, splut, splut; every 20 seconds the little waves emerged. No two of them were exactly alike, but almost every one was a little rolling beauty with a slick concave face and a feathery fringe on top. To enhance the spectacle of his automatic mini-waves, Dexter adorned the imported California beach sand at the shallow end of his pool-hall lagoon with scale-model palm trees and Polynesian houses. At the sight of such lovely waves spilling onto such an exotic shore, any Lilliputian surfer who happened into the pool hall would have been stoked, really stoked. As it turned out, the only creatures that used Dexter's miniature surfing paradise were the large roaches that shared the premises. In the course of the summer a number of the pool-hall roaches ventured, or fell, into the little lagoon and drowned.

As anyone with a drop of water on the brain might have guessed, Phil Dexter hoped someday to turn his little pool-hall operation into something bigger. And indeed he did. Today, nine miles east of the Phoenix pool hall on an arid flat in the adjacent city of Tempe, there is a full-scale replica of the little dream lagoon that Dexter built two years ago. Today it is all there, life-sized: the Poly-

nesian houses, the wind-tossed palms and the singing waves—a 7½-acre Pacific paradise sitting on sunbaked Arizona ground that has not been washed by the real sea for 300 million years.

The only jolting difference between the original pool-hall lagoon and the full-scale paradise that now exists in Tempe is the effectiveness of the instant surf that Dexter invented. Two years ago in the hot and sweaty pool hall, each time the small gate of Dexter's model reservoir opened, about 23 gallons of water burbled out, exerting enough force to nudge a drowned roach a few feet toward shore. By contrast, the 157½-foot-wide reservoir at the deep end of the life-sized lagoon in Tempe is a mighty giant, containing half a million gallons of water. Each time the 15 underwater gates of the reservoir flick open, in 1.7 seconds, 50,000 gallons roll out and over

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## SURFING continued

a submerged baffle, with a thunderous whump that sounds like a salvo from a battleship somewhere over the horizon. The sudden shock of 50,000 gallons of water on the 2½-acre lagoon creates a five-foot wave that can carry several dozen surfers more than 100 yards on its slippery face.

To create a surfable five-foot wave on a sloping ocean shore, dear Mother Nature has to keep a 15-knot wind blowing for a day across a 400-mile fetch of water. At Big Surf, in a span of 40 feet—whump—a surfable wave is born once a minute. Early this fall, before Big Surf was open to the public, a dozen surfers had driven 300 miles or more from the California coast, hungering for a chance to try the instant surf in the desert. Like ancient wise men following a strange star, curious oceanographers also came into the desert and saw the miracle of the waves and were mightily shaken and went back into their own lands to spread the word.

In some respects Dexter's Big Surf in Arizona is a trifle too real. On their first day at Big Surf, some women are reluctant to put their heads under the waves for fear of spoiling their hairdos in salt water. Surfers who fall off their boards on their first ride often insist they can taste salt in the water (it is their own sweat draining off their heads). Children accustomed to the seashore scan the gravelly strand of Big Surf for shells—and actually find a few fragments of freshwater clams. In the quiet of evening ducks occasionally settle into the lagoon, but after dipping their bills a few times and tasting chlorine they move on. In the gold light of one late October afternoon, a least bittern lit on a piling at Big Surf and cocked its head from side to side, searching the lagoon for a sign of schooling fish. Impressed by the realism of Big Surf, Robert Allison of the *Phoenix Gazette* wrote: "The only thing it needs to duplicate a penned-up portion of ocean beach is a few old beer cans and some tar on the sand."

Phil Dexter, the Big Surf man, never saw the ocean until he went to sea in the closing year of World War II. Because he served on the U.S.S. *Saginaw Bay*, a pocket carrier that wallowed like a teak raft, he might have come to hate waves except that he was blessed with an iron gut. While those about him on the *Saginaw Bay* were throwing up, Dex-

ter enjoyed the spectacle of heavy seas. He did not get a good look at waves again until 1965, when he left Phoenix temporarily to serve as a construction engineer on two projects in California. While driving from one project in San Diego to the other in Los Angeles, Dexter often pulled off the road to watch wave riders at San Onofre, Dana Point and Huntington Beach. "What was there about the waves?" Dexter says. "I do not know, except that they were beautiful. To me they were very beautiful when people were riding them."

When he returned to Phoenix, egged on by the surfers who frequently performed on television, Dexter became obsessed with the idea of making inland waves. By the fall of 1966 he had stuffed himself with hydrological data and had built a three-foot-wide backyard wave maker that burped out three gallons of water and created a 2½-inch wave.

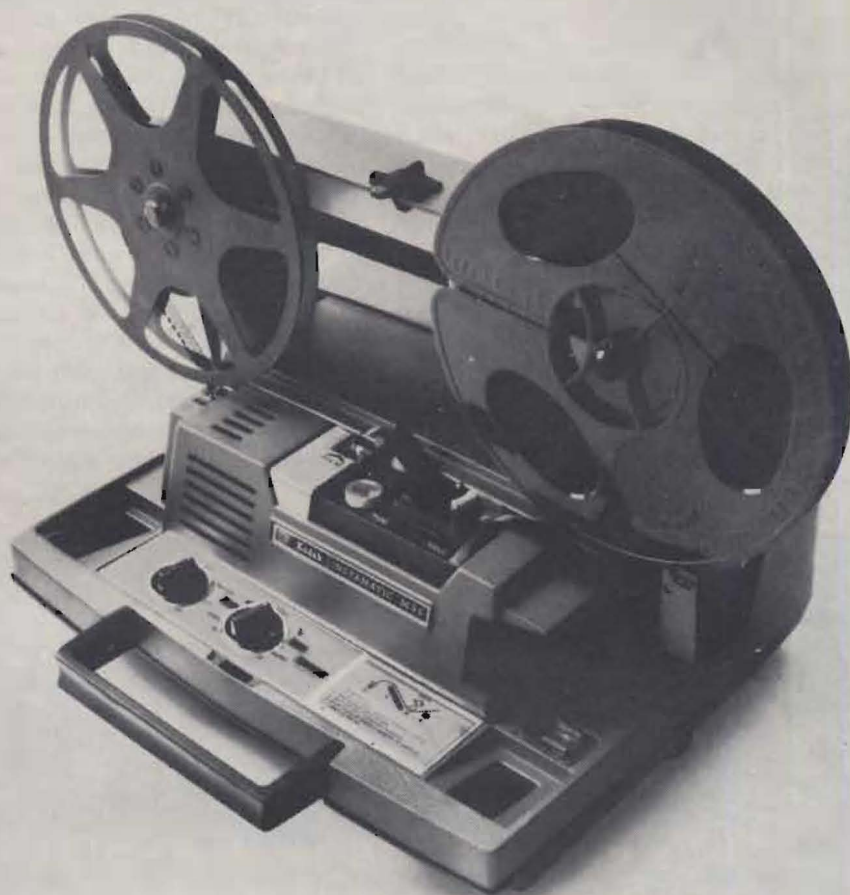
From his backyard experiments Dexter knew that the creation of a good, rolling wave depended on a neat relationship of several critical elements: the height of the head of water, the size and speed of the submerged gate, the shape and height of the baffle and the configuration of the lagoon over which the wave would roll. Even after he had put together the right combination to produce a good-looking 2½-inch wave, he still had one big doubt: if he built a wave maker 24 times as large, would it turn out a five-foot wave that shaped up as well?

To find the answer Dexter telephoned a professional colleague, a soil and foundation engineer named Dwaine Sergeant. At the outset Dexter told Sergeant a big fat lie: specifically, that his 14-year-old son had built a scale-model wave machine as a school science project and needed an expert opinion. When Sergeant did not rise to this bait, Dexter admitted that he, not his son, had built the machine "for recreational purposes." Although Dexter knew that Sergeant had worked with waves in test tanks, he did not know that Sergeant also had a solid reputation as the world's second-worst surfer. (Dexter himself is the world's worst surfer.) Indeed, that very summer Sergeant had spent two weeks falling off a surfboard on the California coast. On hearing the words "for recreational purposes," Sergeant knew what Dexter had in mind. When he went to Dexter's house and saw the backyard wave machine in action, Sergeant said simply, "You will

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probably be the next young millionaire of Phoenix."

In exchange for stock, 30 local citizens put up \$25,000 to help Dexter build his wave-making laboratory in the abandoned pool hall. After he had turned out 60,000 waves in the summer of 1967, Dexter began casting about for the kind of backer who might be interested in investing a million or so in the construction of a man-sized surfing spot in Arizona. He got a polite no thanks from a number of corporations and no answer at all from others. Within a week of writing he did get one enthusiastic, albeit qualified, yes from Clairol, a company that has been spectacularly successful in the art of making waves in human hair but had never stuck its corporate foot in any wave-making concoction as simple as water. Dexter approached Clairol because, to judge by its sales pitches, the company seemed young in heart and open to brave new ideas. By the luck of it as much as anything, he had addressed his letter to Clairol's ex-

ecutive vice-president, John D. Mack, who has always made a point of examining extravagant proposals that come over the transom and has converted a few of them into bestsellers.

Although the \$2 million Big Surf in the desert produces just about the shape of wave Dexter had in mind, the whole complex was not created without a few cruel surprises, large and small. The regular wax that Clairol bought for surfers to use on their boards turned to soup on the hottest days in Phoenix; a new wax with a higher melting point had to be concocted. When Big Surf began operating on a trial basis this past September, the force of the waves twice tore up the bottom of the lagoon. Each time 2.8 million gallons of water had to be drained off so repairs could be made. The 23,000 tons of gravel Clairol imported from an Arizona damsite for use on the Big Surf beach allegedly had been washed free of mud—but probably not in the last 300 million years. When the first waves rolled over the Big Surf beach,

the entire lagoon turned mud brown and looked about as inviting as the Lower Ganges Canal on washday. After days of wave making and continuous filtering and refiltering of the water, the mud finally was cleaned out of the gravel. The waves that come dancing across the Big Surf lagoon today sparkle like the bright Pacific.

On an ordinary day at Big Surf the waves are very orthodox, easily ridden by surfers of modest competence. By opening only half the gates, the management can turn out smaller waves suitable for toddlers and duds. At such times as when the experts gather for a competition, the operators of Big Surf will be able to produce waves that break from right to left or from left to right by tinkering with the timing of the gates. By playing around with movable underwater reefs it is possible to make the waves still cuter and trickier. "Big Surf is sort of like the keyboard of a new kind of organ," Dexter says. "We're still learning how to play it." **END**

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