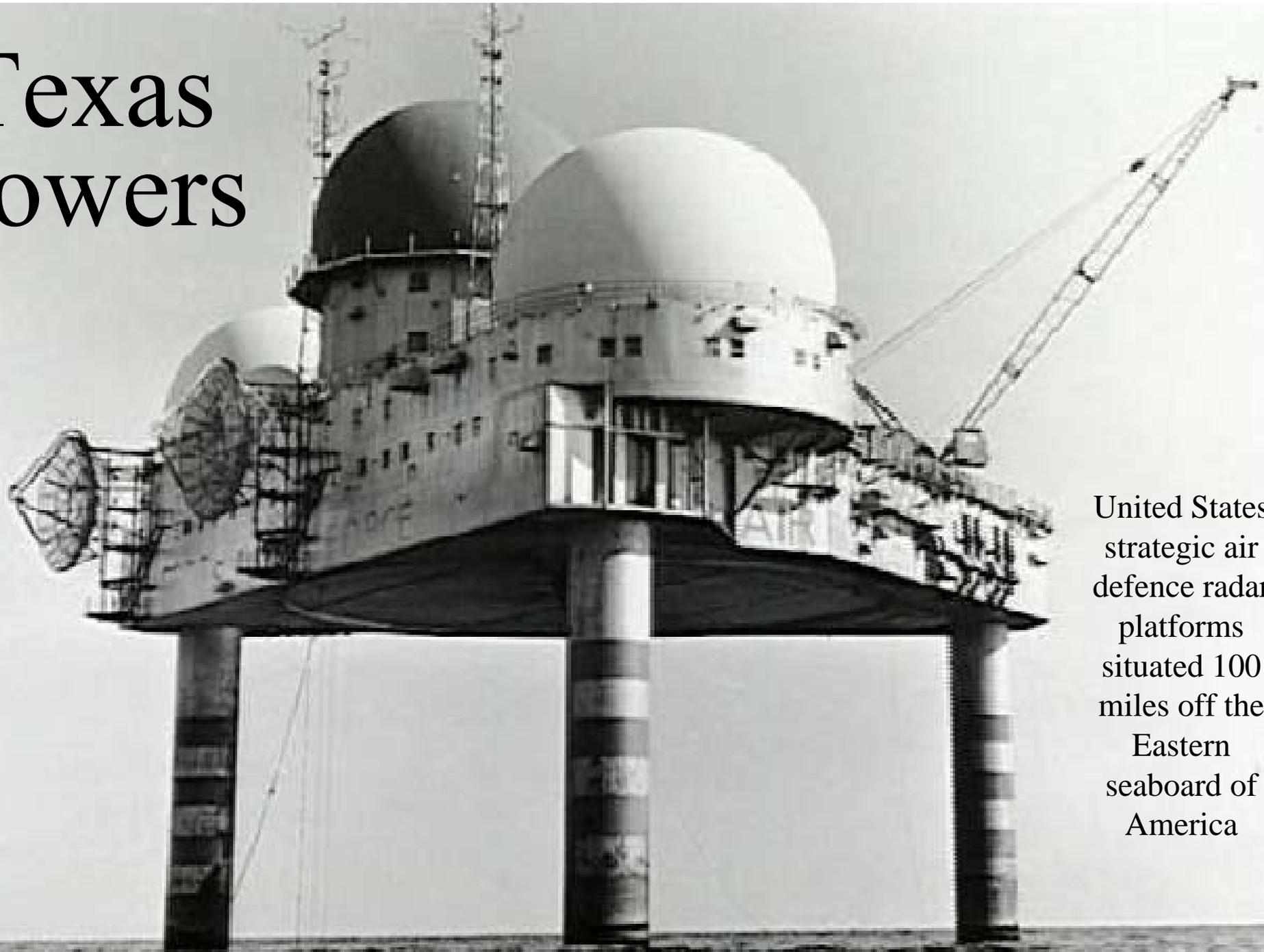


Texas Towers



United States
strategic air
defence radar
platforms
situated 100
miles off the
Eastern
seaboard of
America

The Cold War was the period of conflict, tension and competition between the United States and the Soviet Union and their respective allies from the mid-1940s until the early 1990s. Throughout the period, the rivalry between the two superpowers was played out in multiple arenas: military coalitions; ideology, psychology, and espionage; military, industrial, and technological developments, including the space race; costly defence spending; a massive conventional and nuclear arms race; and many proxy wars.

Fastening radar platforms to the ocean floor was first studied in the summer of 1952. MIT's Lincoln Laboratory analysed the feasibility of stationing search and height-finding radars on giant metal towers planted at intervals along the ocean bottom, similar to oil-drilling rigs employed in the Gulf of Mexico. Lincoln Laboratory concluded that a cluster of such Texas Towers might, in fact, profitably serve air defence purposes if erected about 100 miles off the northeaster coast of the Atlantic seaboard. There, elevation of the ocean floor, owing to the continental shelf, conveniently afforded areas shallow enough, yet far enough at sea, to be strategically important. Being fixed installations, Texas Towers could accommodate heavy duty, long-range radars like those used on land. Advance warning furnished by Texas Towers, in combination with other elements of the growing

early warning network, promised to reduce America's vulnerability to surprise attack. Simultaneously, target tracking information supplied by Texas Towers would enable control centres to vector fighter aircraft to intercept unknown targets far out at sea, where hostile bombers could be destroyed long before reaching bomb release lines. Texas Towers would contribute to extending contiguous east-coast radar coverage some 300 to 500 miles seaward. In terms of the air threat of the 1950's, this meant a gain of at least 30 extra minutes warning time of an oncoming bomber attack.

ADC (Air Defense Command) and the USAF became convinced of their necessity and, in the autumn of 1953 authorized construction of five towers.

In mid-1956, the first tower (TT-2), situated some 110 miles east of Cape Cod, was erected by Bethlehem Steel Company.

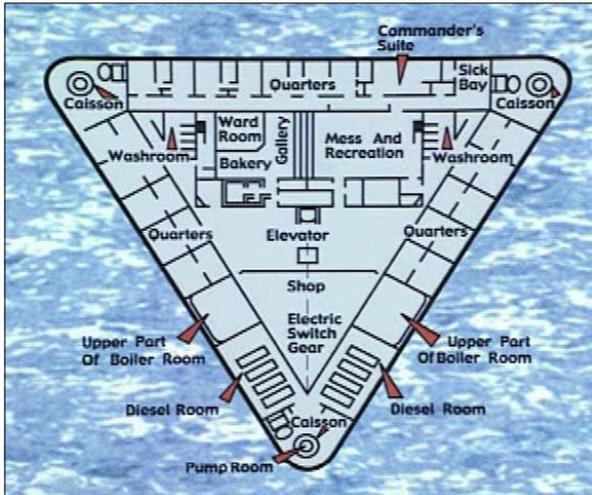
Precedents for selecting search and height-finding radars already existed. For protection from wind, rain and snow, all three antennas (FPS-3A long-range search and two FPS-6 long-range height-finders) were to be enclosed in arctic tower radomes composed of a rubberised dome sprouting bulbously 55 feet in diameter, and supported underneath by a walled framework. These helped characterize



In late 1956, because of the promise of increased off-shore radar coverage by coastal AC&W squadrons in the vicinity of where TT-1 and TT-5 were scheduled to be built, ADC agreed to drop TT-1 and TT-5 from all further consideration, leaving only three towers, TT-2, TT-3 and TT-4, in the program.

the shape Texas Towers finally assumed, silhouetting a cloverleaf profile on stilts. The staffing structure was a total of 54, composed of six officers and 48 airmen.

Tower-to-shore communications presented a problem different from that of radars. There simply was no network of telephone lines conveniently at hand to tap into, as at stations on land. Primary point-to-point multiple-channel tropospheric scatter radio, described in more detail below was therefore adopted.



The steel platform was shaped into an equilateral triangle with cropped ends, measuring 210 feet along all three sides, providing about half an acre of surface area. So that it would conveniently house programmed personnel and equipment, combined with stores, reserves, and spare parts essential for long-term stays, the platform was welded into a self contained, compartmentalized unit 20-feet high, subdivided into separate decks. The bottom-most deck was employed mainly for maintenance and storage space, where tanks and pumps were located. The next deck was partitioned into living quarters, a galley and mess hall, administrative offices, heating and air conditioning areas, recreational areas, food storage space, a dispensary and library. Atop this, across approximately half the wedge-shaped platform, was the helicopter landing area. Occupying the rest of the triangle was the uppermost operations deck, some 210 feet long by 60 feet wide, rising 12 feet above the rest of the 20-foot high platform. Inside this deck was the surveillance and control operations area, on top of which would be perched the three radar antennas enveloped by pressurized arctic towers. Equipped with radars and other gear, the platform, weighed 6,500 tons or so.

Transporting the first platform from shore to site was a toilsome task. There was trouble enough

launching it into water, let alone hauling it to sea. Yet, by June 1955, it was successfully floated and fitted for its sea voyage.



Texas Tower 2 on route to site

Responsibility for towing it to site and then erecting it, was vested in the Raymond and De Long Companies, who embarked with their charge on 12 July 1955. Within two days time, they arrived on site.

Hereupon, temporary legs were dropped to the shoal (about 55 feet under water); the tower platform was jacked up to rest on the temporary legs high above the water, while the three permanent legs, or caissons were readied. Each of the three tubular legs was designed for lasting support, measuring over 160 feet long, the first 48 or so feet of which were ensconced snugly into the shoal, the middle 55 feet of which remained immersed in water, and the top



Texas Tower 2 fixed to ocean floor and starting to take shape

60 or so feet of which rose above the waters surface, lifting the platform high and out of harms way. The legs were versatile enough to be logistically, as well as architecturally purposeful. For inside each steel leg was encased a 140-foot long steel tube six feet in diameter where thousands of gallons of fluid reserves, mostly water and fuel oil, might be stored, surrounded by a jacket of concrete over two feet thick. One of the three hollow legs contained seawater tapped for conversion to drinking water. To this end, distillation equipment was included for producing several gallons of fresh water per minute.

Along with the radars arrived the communications equipment. Foremost among this equipment came the point-to-point, FRC-56 tropospheric scatter system. Three parabolic-disk antennas, measuring 28 feet in diameter, were mounted vertically, side by side, along the platform edge supporting the operations deck. Two at a time were utilized for transmitting messages, while all three combined received them.



50 KW-CW, 900 MHz power amplifiers for tropospheric scatter communications, the Texas Towers were a product of the 1950s and a building block for UHF television.

In 1956 and 1957, work proceeded on TT-3 and 4. TT-3 was launched 7 August 1956, and towed to Nantucket Shoal and erected that same month. On 29 November 1956, ADC assumed occupancy. TT-4 was launched by mid-1957, then, starting 28 June 1957, was towed to sea and placed at Unnamed Shoal. ADC gained occupancy in November 1957.

During these same years (1956-1957), personnel serving at TT-2 were learning of peculiarities uniquely associated with Texas Tower duty. For one thing, the metal superstructure seemed to vibrate constantly. As the FPS-20A long-range radar antenna continued unceasingly to spin, the diesel generators to grind out their power, and the other equipment, to crank away at their appointed tasks, TT-2 rattled vibrantly from the ordeal. Standing like a three-pronged tuning fork, the tower resonated with noises that spread farther, and amplified greater, than initially occasioned by their source. Matters were not improved when, every half-minute or so during the frequent fogs, the dismal-sounding foghorn croaked out its forlorn message.



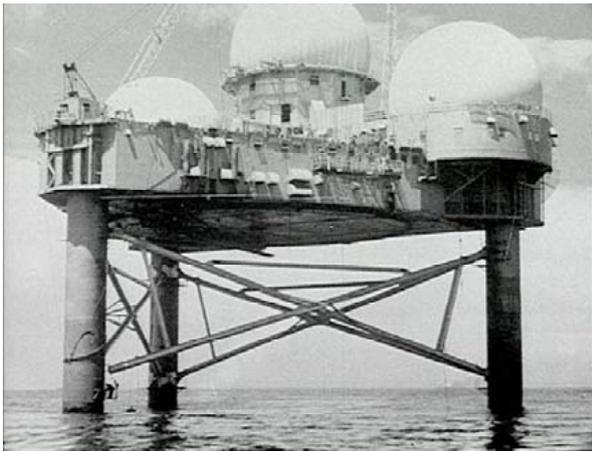
Inflating the rubberised protective radome on one of the FPS-6 long-range height-finders radars.

The End is near for TT-4

A problem of inherent instability at Texas Tower 4 loomed so large at this time that it overshadowed all previous Texas Tower problems. Ever since TT-4 was towed to site in mid-1957, it had become an engineering nightmare. To begin with, supports for TT-4 had been made somewhat differently from those fabricated for TT-2 and TT-3, chiefly because of the extra depth involved. Whereas TT-2 and TT-3 stood firmly in relatively shallow waters, 56 and 80 feet, respectively, TT-4 stood in water two to three times deeper, 185 feet to be exact. A series of underwater bracings were made to compensate for the extra stresses incurred. But in the process of towing TT-4 to site in June-July 1957, two diagonal braces, vital to lacing the three legs snugly together, were lost. The contractor and the Bureau of Yards and Docks decided to improvise repairs on the spot, rather than return to shore for reworking defective portions. The original design strength, consequently, was not restored.

From the time it was erected, Texas Tower 4 wobbled some when under stress caused by brisk winds and waves, earning it the nickname "Old Shaky". Platform motion became the rule rather than the exception. The Navy, in late 1958, conducted underwater surveys of TT-4's

supports, resulting in the discovery that certain collar connection bolts either had sheared or worn loose. The problem was aggravated because the defective portion weakened not only its immediate area, but also shifted considerable stress onto non-defective members. From late 1958 to May 1959, with at least six interruptions due to storms, the contractor effected repairs that stabilized the platform for several months. Four successive storms struck in the winter of 1959-1960, which threatened to undo tower stability all over again.



In August 1960 a set of above-water bracings called X-Bracing were applied. According to the contractor, original design strength was restored to TT-4 it could withstand winds up to 125 miles per hour and breaking waves up to 35 feet high.

Then on 14 and 15 January 1961, TT-4 was again caught in a storm that battered the tower with winds up to 85 miles per hour and waves up to 35 feet high thrashed its legs. At 1915 hours on 15 January the Navy supply ship AKL-17 was only ten miles from Number Four when she picked up a distress from the tower. The edifice was now tilting back and forth. Capt. Gordon T. Phelan, commanding officer in charge of the 13 Air Force personnel and the 14 civilians in the Texas Tower, is reported to have said that he thought the tower could hold out until dawn. As a lull in the storm was expected around two o'clock Monday morning, he was planning on evacuation of the men at that time.

Then came the final SOS. Immediately upon receiving the SOS from Capt. Phelan the Supply Ship AKL-17 along with Aircraft Carrier Wasp keeping the structure on their radar screens proceeded as fast as the great storm would allow toward the tower.

Finally, Texas Tower 4 could stand no more. At about twenty minutes past seven 15 January, it is believed one of its three legs bent in half; but the tower remain partially above water supported by the two remaining legs and the



damaged leg. It is also believed suddenly at twenty eight minutes past seven that night the image of the tower vanished from the AKL-17's radar when the remaining two legs also bent and then cracked and the tower was never seen again. It is presumed that the tower collapsed at this moment. Men on duty in the Wasp's radar room at the time noted the image vanishing at about the same moment that it was reported from the AKL-17.

There were no survivors from whom the story of the disaster might have been learned, and we can only attempt a reconstruction of the final moments of TT-4. All evidence indicates that the men on the Tower had been thrown into the sea without warning and with no preparation for the collapse.

Divers made a shallow water dive that determined the jagged edges of the tower were then within 20 feet of the surface. In the luminous glow from the structure below, they were able to estimate that the mass of the tower was still lying parallel and nearby.





"Old Shaky" Texas Tower 4
Limited edition print by ML StClair
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Because of this hope for survival, divers from the Wasp descended into the sea to look for signs of life on the sunken radar tower. These efforts resulted in definite proof that no one was still alive within the structure when the diving was carried out. The tragedy of TT-4, as much as anything else, sealed the fate of TT-2 and TT-3. While both remaining towers were immediately checked for safety and structural strength, and pronounced sound in this regard, their days were numbered.

Ultimately, it was decided to phase out TT-2 and TT-3 when in 1963 ALRI (Automatic Long Range Input) equipment became operational. No longer having a need for TT-2 and TT-3, and still mindful of the catastrophe at TT-4, ADC ordered the two towers dismantled. TT-2 was first to go, being decommissioned 15 January 1963, then stripped of its communications and electronics equipment. Its three legs were dynamited; but the platform, rather than float to

shore, plunged

to the bottom, denying one

salvage company the fruits of its preparations. It was as if the capricious Atlantic, vindictive to the last, pulled down another victim to its murky bottom.

TT-3 was decommissioned 25 March 1963, and shortly relieved of its radars and communications equipment. Special care was taken in mid-1964 to save TT-3's platform, the bottom deck was pumped full of urethane foam, then sealed, to insure floatation. On 6 August 1964, the three legs were blasted out from beneath it, whereupon TT-3 platform plunged into the ocean; cork-like, it then rose to the surface, enabling salvage crews to drag it shoreward. Once and for all, the episode of Texas Towers in air defence was brought to a close.



4604th Support Group
(Texas Towers) Insignia



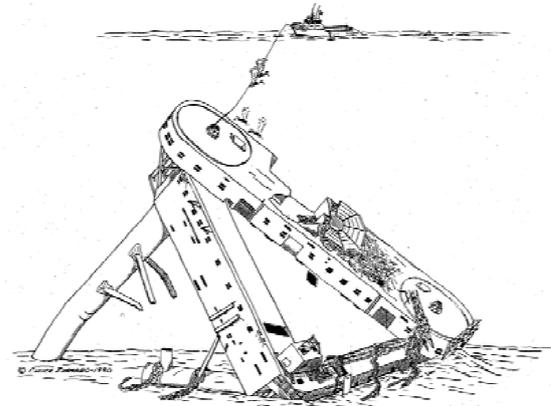
Texas Tower 4 Today

TT4 rests in 180 feet of water 58 miles out off Fire Island Inlet. Although this huge structure really doesn't classify as a ship wreck, her broken bones which rise to within 130 feet of the surface host an incredible amount and variety of marine life. The upper most portion of the tower is one of the corners of her huge deck tripod.

Visibility is usually excellent and at times can be spectacular. Even though the Towers structure rose to a relatively shallow depth this is definitely an advanced dive for experienced wreck divers only. The Towers triangular deck used to rest on a steep downward angle. Time and the ravages of the ocean have caused a further collapse. Her radar domes are now lying close to the bottom with their outer shell deteriorating away.



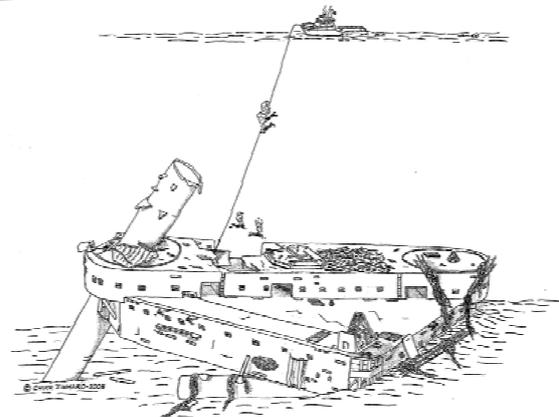
Research divers approach the Towers crane wreckage which is resting on Caisson C. The depth is around 160 feet.



Texas Tower 4 as it rested on the ocean floor prior to 2000.



Diving at the edge of the deck of Texas Tower 4



Decay and the ocean currents have caused the Tower to slide down Caisson A. This is how it appears today.



AN/FPS6 Long-range Height-finder radar prior to installation of the bulbous radome

Courtesy of Chuck Zimmario
(Source: National Archives)



The well equipped Mess Hall in Texas Tower 4



These show the carnage and wreckage strewn around the kitchen area, two decks down. Trays, carts and miscellaneous equipment can be seen covered with silt, and pipes and cables drape across much of the debris in this area. Note in the upper right side of the photo, is the large (40-cup) coffee urn, as illustrated in the top photo, still resting on the end of the food serving counter.



Remains of the same radar as observed recently



Dish rinsing sink in washing area in mess hall

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Mark Farmer <http://www.thetexastowers.com>, and with acknowledgement of the many contributors to his website, Chuck Zimmario dpoceandvr@gmail.com for his under water images and willing help to tell the whole story of TT4, and Mick St.Clair stclairart@yahoo.com for permission to include his "Old Shaky" print.

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