Pacific drilling dates Atlantic opening

It is typical of the new global view of earth-shaping forces brought to us by discoveries in geophysics in the last decade that ocean-bottom rocks recovered from beneath the Pacific Ocean can tell scientists something about the processes that created the Atlantic Ocean.

That's exactly what has happened as a result of the 32nd voyage of the Glomar Challenger, completed in October. The research vessel of the Deep Sea Drilling Project recovered cores from the Pacific floor between Japan and Hawaii. One of the most significant results established that an unusual magnetic band in the northwest Pacific corresponds to a similar band existing on both sides of the Atlantic Ocean. Geophysicists read these magnetic stripes—"frozen" into cooling rock shortly after new ocean crust is created—in much the same way archaeologists read tree rings to determine the age of the tree and conditions during the past.

From geologic study of the cores retrieved near the magnetic band, the scientists determined that it represents the period of approximately 115 million to 150 million years ago; its width indicates that sea-floor spreading was creating new ocean crust about twice as fast as normal during that period.

The correlation with the magnetic stripes in the South Atlantic allows the scientists to obtain the most accurate date yet for the opening of the South Atlantic Ocean: That event occurred about 125 million to 130 million years ago. At that time the fledgling Atlantic was just a narrow strip of water, like the Red Sea or the Gulf of California today.

Balloon-borne antennas: Boon to communications

More than two miles in the air above balmy Grand Bahama Island floats a balloon. But what a balloon it is. Taller than a 15-story building, the 175-foot behemoth is a brilliant white, held in place by a brawny cable that anchors it to the ground. By day, brightly colored pennants mark the cable every 500 feet, while by night both balloon and tether are illuminated by flashing strobe lights. Airplane pilots give it a three-mile berth.

It sounds (and looks) like some bromdignagian beach-front billboard dreamed up by the department of tourism. In fact, however, the bulbous bubble is all business. Attached to its belly is a compartment packed with automatic television and radio equipment which its owners hope will make it the answer to the communications needs of developing nations.

The balloon's lofty vantage point, according to a Westinghouse subsidiary called TCOM (for Tethered COMmunications) Corp., would enable it to take the place of at least 15 conventional broadcast and microwave towers. A 3.2-watt transmitter aboard the "aerostat," says the company, would produce the same signal strength 100 miles away as a 1,000-foot tower with a radiating power of 100,000 watts.

No people ride the aerostat. At present the electronics are powered by a gasoline engine, and about once a week the balloon is reeled in, the engine gassed up and the whole thing let out again, a process that takes under two hours. For two years, however, TCOM has been working to replace the tether with a giant extension cord—"so you don't have to play the elevator game," says one engineer. The balloon arrived at Grand Bahama in August, and its aerodynamic stability—a major factor in the design—has exceeded expectations. After a test broadcast of the sixth game of the World Series, TCOM engineers discovered that their baby had been calmly riding out 93-mile-per-hour winds from Hurricane Gilda with less than 1,000 feet of drift.

A typical one-balloon system might cost $5 million, but tethered-balloon broadcasts themselves are nothing new. In 1920, a Pittsburgh radio station lofted a balloon-borne antenna to carry the election of Warren G. Harding. □

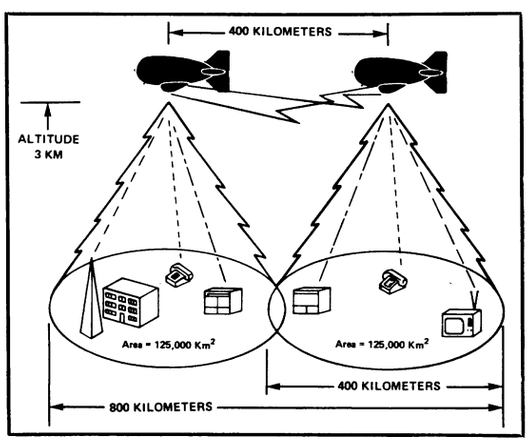
How the cat's tail twitches

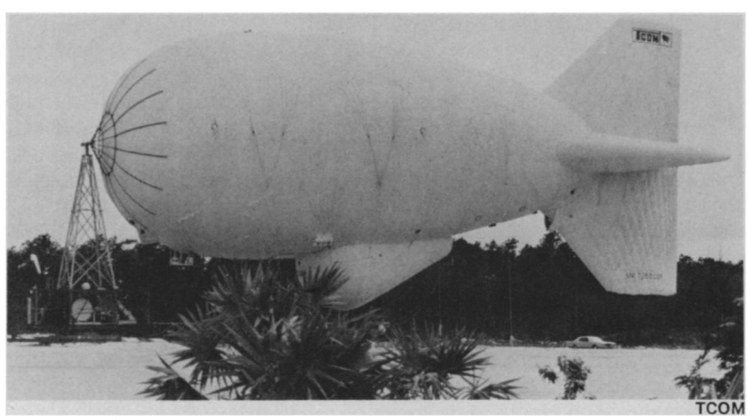
This is the time of year when cats yowl at the Harvest moon or twitch their tails from broomsticks. But 20 cats at the National Institutes of Health have just finished lending their tails to muscle research.

They were under the supervision of D. A. Riley, a muscle anatomist who is attempting to find out how nerves influence the muscles they innervate. He chose cat tails for several reasons.

The muscle fibers in the tails were segregated from the rest of the cats' bodies so the cats could go about their normal business while their tails were being studied. Sensory nerves innervating the muscles in their tails could be severed, so they did not feel the tests being conducted on their tails. The nerves innervating the tail muscles could be silenced so that Riley could stimulate them at will. Riley was also able to surgically remove various muscle fibers from the tails for examination under the microscope, then sew the tails back up. "The cats were not disturbed by this," says Riley.

Each unit of muscle fibers is innervated by one nerve. That nerve stimulates the fibers with a particular electrical pattern. Low electrical frequencies in long bursts—tonic stimulation—are sent into muscle fibers involved in ongoing muscle activities, such as jogging, running, holding something in your hand, maintaining posture. High frequencies in short bursts—phasic





Balloon-borne antennas: Possible answer to communications needs.