

variations do turn out to be real, none of the theories proposed for the radio pulses account for them. All would have to be discarded.

**Dr. Burbidge** foresees that "ideas a year from now concerning pulsars will be totally different than they are this month."

Dr. Jesse L. Greenstein of California Institute of Technology suggests that the regions that perhaps radiate light from pulsars are not the same as those sending out radio waves, with high density regions emitting light and low density ones, radio. He also believes the optical identification of CP 1919 must have further confirmation, a statement made before the Lick data were found erroneous.

Any successful theory will have to explain not only an energy source radiating over the wide range from radio waves to light—if the light pulses are real—but also the repetition rate, so highly precise that it can be used to keep time (SN: 3/16, p. 255).

Scientists at the Naval Research Laboratory are planning this month to use the pulses from CP 1919 to check Einstein's theory of general relativity. With their 85-foot radio telescope, they will

search for a Doppler effect involving the orbital motion of the earth and the gravitational field of the sun.

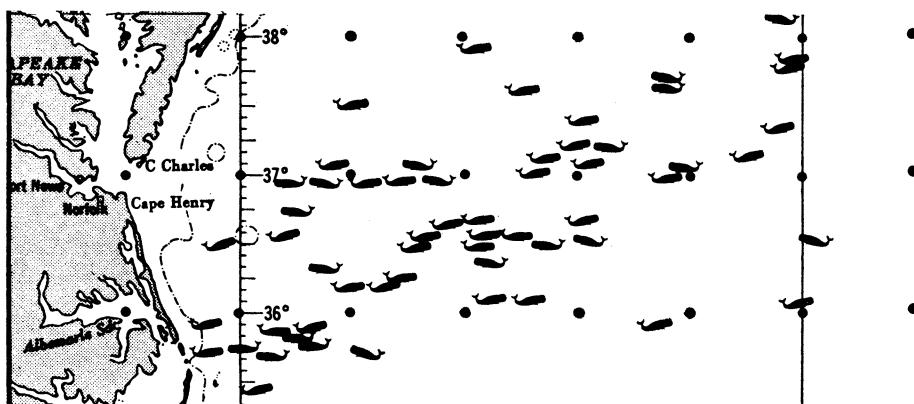
According to relativity theory, when the earth penetrates most deeply into the solar gravitational field, in January, terrestrial clocks slow down, compared to their rate in June when farthest from the sun. The June measurements, expected to be taken over a 10-day period, will be repeated next January, the difference to be recorded amounting to about one part in a billion.

Since the pulsar variations can be measured with an accuracy of one part in a 100 million during a 10-day interval, the pulsar clock beyond the solar system could be used to check whether or not terrestrial atomic clocks show a frequency shift. A slow-down at perihelion of about two parts in a billion is predicted by Dr. Banesh Hoffmann of City University of New York's Queen's College in the May 18 *Nature*.

In all the observations of pulsar's now going forward one thing is certain: The researchers, having seen the results of precipitous reporting of data from the Lick experiments, will certainly hold up their results until they can be checked and double-checked.

#### THAR SHE BLOWS

#### Learning what the whalers knew



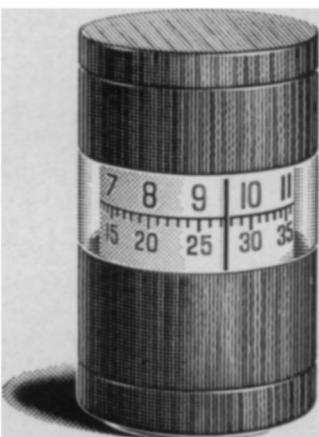
Aerial surveys find whales congregating in the Southern Ground.

Seventeenth and eighteenth century whaling captains used to frequent a section of the North Atlantic known as the Southern Ground, where, they believed, whales were more numerous than in other parts of the ocean. The region extended roughly from Philadelphia to Cape Hatteras and from the United States coast east to about 60 degrees west longitude. It was especially popular because of its proximity to New England ports.

It's no ancient mariner's tale, says the U.S. Naval Oceanographic Office. Aerial surveys show that there are in-

deed more whales in this area, especially the western portion of it, than elsewhere. Over 200 hours of aerial surveys have been flown since 1966. Of the 132 whales observed, over 90 percent were in the western part of the Gulf Stream, which flows through the old Southern Ground.

Oceanographers are now trying to find out why the whales congregate in the Gulf Stream. As they gather more data, they are trying to correlate the number of whales with data on environmental factors that might plausibly affect their behavior.



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