

...d to his physical education as an athlete. He changed his life Fitness coach 110 clubs from Columbia and the next four years small towns in major urban centers has one in desk-bound office in an exercise before climb

Goodbye my are people or who have there is what they do and he says. hip with rolling spender out 40 ne," by r. despite the c r, the 250/ sold work 10 s to the

...the York University astronomy team uses to peer into the hearts of celestial bodies and test Einstein's general theory of relativity. Except that its global receiver pulls in radio pulses rather than TV signals. The signals are born when ultrafast electrons slice through the magnetic fields around stars and objects such as pulsars and quasars.

And the university's dish is a virtual/world-sized receiver created by interweaving signals from 15 comparatively ordinary radio telescopes in the U.S., Europe, Australia and sometimes an aging dish deep inside Algonquin provincial park.

The technique is almost as complicated as the official name: Very Long Baseline Interferometry, or VLBI.

"Very Long" is fairly obvious, especially if you think of a dish in New Mexico and another in Spain. "Baseline" is the imaginary line between the two locations, something like the line from home plate to first base.

The toughest is obviously "interferometry," but that's really nothing more than the measurement of interference in radio signals. Astronomers, however, aren't interested in the popping and hissing in ordinary radio reception.

Instead, they're looking at the troughs and valleys of the radio waves from some celestial body recorded at the two radio telescopes along that very long baseline. If those signals are combined, the radio signals can either reinforce or annihilate one another, like intersecting waves from dropping two pebbles at different spots in a pond.

This interference pattern tells the astronomers when the same wave front arrived at the two telescopes. It can't be simultaneous since one dish will be marginally closer to the distant source because of the curvature of the Earth. For radio waves travelling at the speed of light, that difference is typically no more than one-hundredth of a second, measured to an accuracy of 10 picoseconds — where pico means a trillionth.

The astronomers can measure this finely because they know the distance between the two radio telescopes down to a few millimetres; they measure time with hydrogen clocks accurate to one second in a million years.

That allows an equally precise calculation of the position of the celestial object. Now repeat this procedure for all other possible pairings of the 15 radio telescopes as they sweep long arcs across the face of the Earth during a 12-hour rotation. Crunch a computer of data in a supercomputer called a correlator and massage carefully by hand.

The result is a



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Big ultra-f

Lost in re-translation

From Rusties on D7

Though his elegiac new album *Prairie Wind* contains some of his most plainspoken sentiments, Neil Young has occasionally struck anyone determined to draw a parallel between his art and his life as a stubbornly enigmatic writer.

"Well, I dreamed I saw the knights in armour coming/Saying something about a queen. There were peasants singing and drummers drumming/And the archer split the tree."

Okay, the true geeks among us know those words were inspired by an unproduced screenplay, co-written by actor Dean Stockwell, that had something to do with an earthquake, a flood, and a bunch of aliens but still.

Because *FinalNotes* is so easily distracted, they, a piece of lint, Sorry, where were we? that piece of lint set us to musing about what might happen if we ran some of Young's best-known lyrics through an online translator, and then re-translated the ensuing translation back into English. (You're not to wonder why.)

So we went to the reliable Linguist's Word Fish tool to translate Young's words into French, and then back into English. Here are a few examples of the deformed wisdom it spit back.

□ "Rockin' in the Free World:"
"We got a thousand points of light For the homeless man. We got a kinder, gentler Machine on hand."

The twice-translated version:
"We obtained thousand points of light For the man without hearth. We obtained more pleasant, softer, hand of machine-gun."

□ "Heart of Gold:"
"I've been in my mind. It's such a fine line/That keeps me searching for a heart of gold. And I'm getting gold."

That becomes:
"I was in my spirit/It is a so fine line Which continues me to seek a gold heart/And I age."

□ "Cinnamon Girl:"
"Ten silver axes, a bass with a bow. The drummer relaxes and waits between shows/For his cinnamon girl."

Re-translated:
"Ten axes silver plated, low with an arc/Which the beater slackens and awaits between the exposures. For his/her cinnamon daughter."

