

TWO HEMISPHERES

Leon F. Graves (1)
 Institute for Storm Research
 4104 Mt. Vernon
 Houston, Texas 77006

The satellite photo showing northern and southern hemisphere circulations with one vortex near New Zealand (2) reminded me of the time a physicist colleague of mine expressed surprise when I pointed out that he was using a few southern hemisphere wind arrows in explaining United States weather maps to his liberal arts students. He had not noticed that the barbs pointed to lower pressure and therefore that southern hemisphere wind arrows were mirror images of northern hemisphere wind arrows. Such are the perils of teaching meteorology.

I am enclosing a copy of an assignment I used to make to students in an elective one-semester course in meteorology. The students did a good job of research and generally found that, in washbowl circulations, coriolis force prevailed a little over half the time (ten percent were indeterminate). They learned about friction, turbulence, centripetal/centrifugal force and even a little statistics and probability.

The response to the question about southern hemisphere toilets was not as satisfying. I thought the students should learn a little about the difference between free flow convection and forced flow convection. Toilet bowl makers wisely take no chances in random circulations and direct the water with a "whoosh" along one side of the bowl so that a definite direction of flow starts immediately. I don't know why toilets used in the United States are for the most part designed for a counter-clockwise circulation. I am familiar with

only one toilet in Houston that flushes with a clockwise outflow and I have no reason to think it was imported from the southern hemisphere. How does your toilet flow? Taking a toilet fixture to the southern hemisphere will not permit the water to start circulating the other way.

After accurately recording the vagaries of slow start-up circulations in washbowls, a few students invariably, perhaps enthralled by the mystique of coriolis forces, predict that a toilet fixture, if taken to the southern hemisphere, will reverse itself and start its circulation in the opposite direction. I was never able to schedule a field trip to a southern hemisphere reststop for a down-and-out decision. The students changed, but the pattern of response was predictable.

Brandli's article also reminded me of Professor James Austin's New Zealand accent. I liked that.

REFERENCES AND FOOTNOTES

1. Leon F. Graves received an M.A. in Physics at Cornell University in 1940 and an M.S. in Meteorology at M.I.T. in 1946. He taught physics at the University of Houston until he retired in 1980. He is now a Research Associate at the Institute for Storm Research at the University of St. Thomas where he has moonlighted since 1968. He is a Certified Consulting Meteorologist.
2. Brandli, Henry W., 1981: Coriolis Force Effects, *National Weather Digest*, 6:4, 35.

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Name: _____

HOMEWORK REPORT ON SINK DRAINAGE

1. In what part of the Houston area do you live?
 NE SE SW NW _____
2. Shape of wash bowl Round Square Oval Other _____
3. Circulation or flow:
 a) Definitely clockwise _____
 b) Somewhat clockwise _____
 c) Undetermined _____
 d) Somewhat counter-clockwise _____
 e) Definitely counter-clockwise _____
4. Total number of observations _____
5. In which direction does the water rotate as it runs down a northern hemisphere toilet? _____
6. In which direction should the water rotate as it runs down a toilet in the southern hemisphere? _____
7. Why? _____

