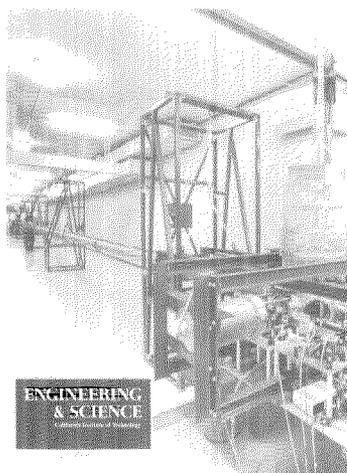


## In This Issue



### Ripples in Space-Time

On the cover — one of the 40-meter-long arms of Caltech's L-shaped gravity wave detector. Gravitational radiation is a propagating strain in space predicted by Einstein's relativity theory but as yet unobserved with any reliability. The almost complete laser interferometer, when its sensitivity is honed as sharp as it can go, will begin a tentative search for these very faint signals that would be produced by such violent astronomical events as a supernova explosion.

Actually, the Caltech instrument is only a prototype for an even more sensitive detector planned on a kilometer scale. And the forerunner of Caltech's prototype is a 10-meter instrument at the University of Glasgow in Scotland.

Architect of both prototypes and, he hopes, the third very large detector also, is



Ronald Drever, whom Caltech has been sharing with the University of Glasgow since 1979. He is a half-time professor of physics at both institutions, although his connection with Glasgow goes back further. Drever received his BSc there in 1953 and his PhD in 1958 and has been on the faculty ever since (titular professor since 1975).

Much of his career has been spent looking for gravity waves. He cheerfully admits to not knowing whether he or anyone else will be able to detect this elusive radiation

but claims, convincingly, that he's having a lot of fun trying. "The Search for Gravitational Waves," beginning on page 6, was adapted from Drever's Seminar Day talk last spring.

### Light Fantastic

Technological problems have plagued the numerous attempts to generate electricity from sunlight cheaply. But a campus/JPL team led by Ahmed Zewail has been developing a very promising technique to increase the efficiency of photovoltaic solar energy conversion and reduce the effective cost of silicon cells. The encouraging progress on this work is described beginning on page 10 in "The Luminescent Solar Concentrator: An Illuminating Solution for Solar Energy" by Dennis Meredith, director of the Caltech news bureau. Zewail, whose research also involves laser-selective chemistry (*E&S*, January-February 1980), is professor of chemical physics at Caltech, where he has worked since 1976. He was born in Egypt and received his BSc in 1967 from the University of Alexandria. His PhD is from the University of Pennsylvania (1974).

### Planetary Recipes

Despite the title of his article "Onions or Plum Puddings?"

David Stevenson is not a chef

but a theoretical physicist. And his gastronomic images (he goes on to include baked Alaska and, less appetizing, rubber ducks and oceans of cleaning fluid) serve as models for the structure and composition of planets in our solar system.



Stevenson became interested in planetary science at Cornell, where he received his PhD in 1976 in theoretical physics. Previously he had earned his BS and MS from Victoria University in his homeland, New Zealand. After two years as a research fellow at the Australian National University in Canberra and another two years as assistant professor at UCLA, he emigrated across town to Caltech. He has been associate professor of planetary science here since 1980.

The article for *E&S*, which begins on page 16, was adapted from his November Watson lecture. Actually, Stevenson does like to cook. He doesn't care much for plum pudding but does put onions in chili, his favorite recipe.

### Statement of Ownership

Statement of ownership, management, and circulation (required by 39 U.S.C. 3685). 1. Title of publication: *Engineering & Science*. A. Publication no.: 00137812. Date of filing: September 27, 1982. 3. Frequency of issue: 5 times a year. A. No. of issues published annually: 5. Annual subscription price: \$7.50. 4. Complete mailing address of known office of publication: 1201 East California Blvd., Pasadena, Los Angeles County, California 91125. 5. Complete mailing address of the headquarters or general business offices of the publishers: Same as above, Public Relations Building. 6. Full names and complete mailing address of publisher, editor, and managing editor: Publisher, Alumni Association, California Institute of Technology, Pasadena, CA 91125; Editor, Jacquelyn Bonner, California Institute of Technology, Pasadena, CA 91125; Managing Editor, none. 7. Owner: Alumni Association, California Institute of Technology, 1201 East California Blvd., Pasadena, CA 91125. 8. Known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages or other securities: none. 9. The purpose, function, and nonprofit status of this organization and the exempt status for Federal income tax purposes has not changed during the preceding 12 months. 10. Extent and nature of circulation: A. Total no. of copies printed: average during preceding 12 months, 13,920; actual number of latest issue, 13,600. B. Paid circulation: 1. sales through dealers and carriers, street vendors and counter sales: average during preceding 12 months, none; actual number of latest issue, none. 2. Mail subscription: average during preceding 12 months, 6,653; actual number of latest issue, 6,030. C. Total paid circulation: average during preceding 12 months, 6,653; actual number of latest issue, 6,030. D. Free distribution by mail, carrier, or other means, samples, complimentary and other free copies: average during preceding 12 months, 6,929; actual number of latest issue, 7,210. E. Total distribution: average during preceding 12 months, 13,582; actual number of latest issue, 13,240. F. Copies not distributed: 1. Office use, left over, unaccounted, spoiled after printing: average during preceding 12 months, 338; actual number of latest issue, 360. 2. Returns from news agents, none. G. Total: average of preceding 12 months, 13,920; actual number of latest issue, 13,600. 11. I certify that the statements made by me above are correct and complete. Jacquelyn D. Bonner, Editor.

STAFF: *Editor*—Jacquelyn Bonner

*Managing Editor*—Jane Dietrich

*Photographer*:—Robert Paz

PICTURE CREDITS: Cover, 7, 11, 14, 16, 21, 27, 32 — Robert Paz/Inside Front Cover, 13, 14, 15, 32 — Chris Tschoegl/14-15 — Floyd Clark/22 — Richard Kee/28 — Jane Dietrich.

*Engineering & Science* (ISSN 0013-7812) is published five times a year, September, November, January, March, and May, at the California Institute of Technology, 1201 East California Boulevard, Pasadena, California 91125. Annual subscription \$7.50 domestic, \$15.00 foreign, \$20.00 foreign air mail, single copies \$1.50. Controlled Circulation postage paid at Pasadena, California. All rights reserved. Reproduction of material contained herein forbidden without authorization. © 1983 Alumni Association California Institute of Technology. Published by the California Institute of Technology and the Alumni Association. Postmaster: Send change of address to Caltech, 1-71, Pasadena, CA 91125.