

# SCIENCE NEWS

The Weekly Newsmagazine of Science

A Science Service Publication  
Volume 124, No. 2, July 9, 1983

E. G. Sherburne Jr. Publisher  
Joel Greenberg Editor  
Dietrick E. Thomsen Senior Editor/  
Physical Sciences  
Joanne Silberner Managing Editor  
Judy Klein Production/Design  
Director  
Wray Herbert Behavioral Sciences  
Joan Arehart-Treichel Biomedicine  
Linda Garmon Chemistry  
Cheryl Simon Earth Sciences  
Julie Ann Miller Life Sciences  
Janet Raloff, Policy/Technology  
Ivars Peterson  
Jonathan Eberhart Space Sciences  
Penny D. Sackett Science Writer Interns  
Sarah Steinberg  
Jane M. Livermore Books  
Donald R. Harless Business Manager  
Scherago Associates Advertising  
Fred Dieffenbach, Sales Director  
1515 Broadway, New York, N.Y. 10036

Copyright © 1983 by Science Service, Inc.,  
Editorial and Business Offices,  
1719 N St., N.W., Washington, D. C. 20036.  
Republication of any portion of SCIENCE NEWS  
without written permission of the publisher is  
prohibited.

Subscription Department  
231 West Center Street, Marion, Ohio 43302

Subscription rate: 1 yr., \$27.50; 2 yrs., \$47.50; 3  
yrs., \$67.00. (Foreign postage \$5.00 additional per  
year.) Change of address: Four to six weeks' notice  
is required. Please state exactly how magazine is to  
be addressed. Include zip code. For new  
subscriptions only call (1) 800-247-2160. Printed in  
U.S.A. Second class postage paid at Washington,  
D. C. Title registered as trademark U. S. and Canadian  
Patent Offices. Published every Saturday by  
SCIENCE SERVICE, Inc. 1719 N St., N.W.,  
Washington, D. C. 20036. (202-785-2255)  
ISSN 0036-8423

## Letters

### Contraceptive correction

In the article on slow release contraceptive systems (SN: 4/9/83, p. 236) you indicate that progestones including levonorgestrel act on the female reproductive system by inhibiting ovulation and thickening the "walls of the uterus." This is not an accurate statement. I am not sure that anyone knows whether it thickens the walls of the uterus. What it should have said is that ovulation is inhibited much of the time but not all and that the drug "thickens the cervical mucus."

Dale N. Robertson, Ph.D.  
The Population Council  
New York, N.Y.

### Counting black holes

Your article "A second black hole candidate" (SN: 5/7/83, p. 299) is in error when it describes LMC X-1 as the second black hole candidate. LMC X-1 is actually the fourth recognized black hole candidate (not counting active galaxy cores). It follows Cyg X-1, Cir X-1 and GX339-4. All are binary systems in which X-ray emission is powered by accretion into a deep gravitational well. Of the four, GX339-4 is probably the most interesting in that the accretion disk, which is the source of black hole X-ray emis-

## This Week

- 20 Do Anomalons Exist? Yes — So Far
- 20 Inflationary model predicts little rotation
- 21 The longest day
- 21 Pioneer Venus craft to study Halley
- 21 Fermilab sets new record
- 22 Finding a home for magnetic information technology research
- 22 TDRS satellite on station at last
- 23 Brain peptide fights fever best
- 23 Diatom mats supply mid-ocean nitrogen fix
- 23 Fuller, 87, dies of heart attack

## Research Notes

- 28 Agriculture
- 28 Space Sciences
- 29 Environment
- 29 Earth Sciences

## Articles

- 24 Earth Fire  
Cover: Kilauea is the world's most active, most heavily instrumented and most accessible volcano — even during eruptions. While each eruption brings scientists greater insight into the volcano, much is yet to be revealed. (USGS photo by J. Buchanan-Banks)

## Departments

- 19 Letters
- 31 Books

**Science Service** Institution for the public understanding of science founded 1921; a nonprofit corporation.  
**Board of Trustees** — *President*, Glenn T. Seaborg; *Vice President*, Gerald F. Tape; *Treasurer*, Willis Harlow Shapley; *Secretary*, Julius Duscha; Joseph W. Berg Jr.; Edward Bliss Jr.; Bowen C. Dees; David A. Goslin; Milton Harris; Hilleary F. Hoskinson; Elizabeth F. Neufeld; O. W. Riegel; H. Guyford Stever; John Troan; Deborah P. Wolfe.

Director: E. G. Sherburne Jr.; Assistant Director: Dorothy Schriver; Business Manager: Donald R. Harless.



ion, is also seen in visible light. This visible light has sometimes been observed to come in sporadic, shot-noise type bursts, such as characterizes black hole X-ray emission. Such bursty emission is the main signature of black hole candidates. For the other three sources white light emission from the accretion disk is masked by intense emission from a normal, highly luminous blue star companion. In contrast is GX339-4, the normal star that is the source of the accreting material, a low luminosity star. Black hole candidates produce X-ray emission only when in accretion flow binary systems, and are distinguishable from neutron star systems by the lack of any observable emission from the neutron star, which must inevitably be heated by the infall process. Neutron star emission is either precisely periodic due to channeled infall onto a rotating, highly magnetized body, or varies irregularly but relatively slowly due to variability in the accretion flow process. In contrast, when the degenerate member of a binary system is a black hole, X-ray emission is observed only from the inner portion of the accretion disk. This emission is characterized by millisecond flickering resulting from intermittent instabilities that transfer angular momentum outward through the disk.

Once material reaches the innermost stable orbit it spirals unseen into the interior of the black hole.

Talbot A. Chubb  
Arlington, Va.

(What is a black hole candidate is something of a matter of confidence in theories. Our reference was to dynamical evidence yielding estimates of the mass of the dark object. We know only Cyg X-1 and LMC X-1 in that category. — Ed.)

### DNA definition: Only partial credit

It is indeed a sad commentary on the state of science education that only 2 percent of the American people know what DNA is ("What is DNA?", SN: 6/4/83, p. 366). Unfortunately, the American Chemical Society and most writers of biology textbooks are also confused when they state that DNA molecules "make copies of themselves." DNA is only a blueprint; it's the protein enzymes that do all of the synthesis, whether of more DNA or of the proteins the specifications for which are carried in the DNA molecule.

Lane P. Lester, Ph.D.  
Liberty Baptist College  
Lynchburg, Va.

JULY 9, 1983

19