(for DArk MAtter) experiment, located underground at the Gran Sasso laboratory in central Italy, are reported. The effect measured by DAMA, if confirmed by the further experimental investigation currently under way to increase statistics, would constitute a major breakthrough in understanding the nature of dark matter in the universe.

Our group (Fiorenza Donato, Nicolao Fornengo, Stefano Scopel, and me) has presented the theoretical implications of the DAMA data in a number of scientific publications (*1*) and at international conferences. We have shown that the DAMA results are widely compatible with an interpretation of a relic super-symmetric particle (neutralino) as a major component of dark matter in the universe. We have also presented in detail the physical properties of this particle and discussed how these features might be investigated at accelerators (the Large Electron-Positron (LEP) accelerator, Tevatron upgrades, or the Large Hadron Collider) and with independent searches for weakly interacting massive particles (by looking for upgoing muons at neutrino telescopes and antiprotons in cosmic rays).

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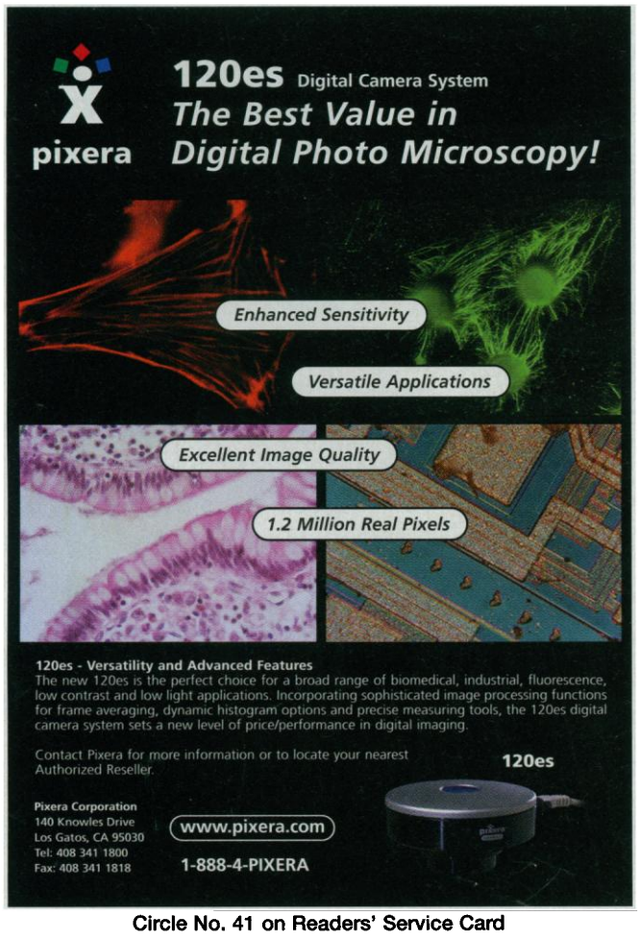
References and Notes

1. A. Bottino, F. Donato, N. Fornengo, S. Scopel, *Phys. Lett. B* **423**, 109 (1998); other papers of ours on this topic are now in press in *Phys. Rev. D* and *Astroparticle Physics* and are posted on the Los Alamos preprint Web site at xxx.lanl.gov/abs/hep-ph/9808456, 9808459, and 9809239. An independent analysis of the DAMA data (by R. Arnowitt and Pran Nath), limited to supergravity unified models, is posted on the Los Alamos Web site (hep-ph/9902237).

Recovering Seveso

In human-dominated ecosystems, chemical pollution and habitat fragmentation are the two main factors affecting natural environments. In the last 7000 years, we have modified half the global land surface, about one-third since the Industrial Revolution (*1*). Because of continuing environmental destruction and modification of agricultural, industrial, and residential uses of land, it is important to study the remedies. Seveso (population 40,000), 16 kilometers north of Milan, Italy, acquired worldwide notoriety on 10 July 1976 because a vapor cloud containing at least 2 kilograms of 2,3,7,8-tetrachlorodibenzopara-dioxin (TCDD) issued from a reactor producing trichlorophenol over an area inhabited by about 2000 people (*2*). After human evacuation from the 80.3 hectares that were most polluted (up to 20×10^3 micrograms per square meter of TCDD), building demolition and 40 centimeters of earth scarification took place over 43 hectares. The scarified area was planted mainly with oak, with scattered grassy and bushy areas. From 1995 through 1997, we investigated plant and animal ecological parameters in Seveso park, comparing the findings of mutagenic tests with those of 10 urban and suburban parks (*3*). Seveso park is isolated in the urban context, with a high isolation index (–20.7 kilometers) and no wildlife corridors. We monitored the presence and concentration of all 2,3,7,8-substituted PCDD/Fs (polychlorinated dibenzo-p-dioxins and dibenzofuranes), including TCDD. The 1998 TCDD soil concentrations do not exceed 16 picograms per gram of dry soil [compare industrial regions with about 20 picograms of Int-TEs (international toxic equivalents) per gram of soil], with no differences between the topsoil and the soil 15 to 30 centimeters deep; the concentrations in moss and earthworms were 5 to 25 picograms per gram of Int-TEs, and the air concentrations of 15 TCDD isomers investigated were 0.3 to 21 picograms per cubic meter. The park has been colonized by annelids, insects, amphibians, reptiles, birds, and mammals. Birds predominate, with 22 to 24 species



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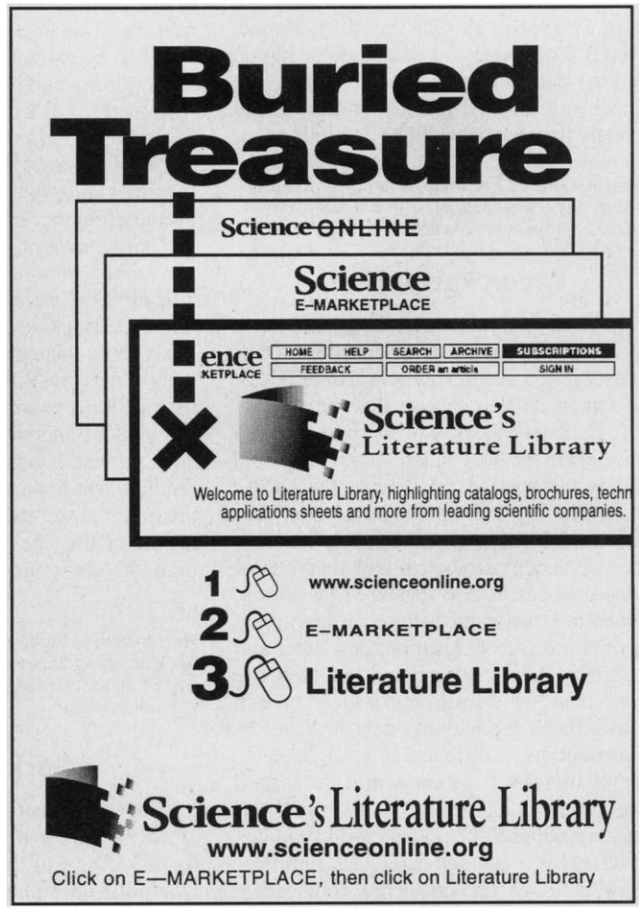

according to season; calculations from the breeding communities reveal high indexes (*3*): species diversity, 3.58; species richness, 17; and kilometric abundance, 179.7. Substantial populations of wood mice, rabbits, and house mice and small colonies of hares, cottontails, and foxes living in the park are useful biological reagents for risk assessment because of their long-term exposure to TCDD. We studied gross morphology features that are endpoints of the action of xenoestrogen-like molecules such as TCDD, even at doses below those that exert maternal effects (*4*). In fetuses (16 rabbits, 38 house mice) and newborns (9 and 17), we found no signs of TCDD action. The number of corpora lutea in pregnant females did not differ significantly from the number of living implants plus reabsorptions (which were very low and similar to those of the control animals). Male reproductive organs and the germ cells cytodifferentiative process were regular in 9 rabbits and 21 house mice: there were no lacuna between Sertoli and gonia cells and no vacuolization of Sertoli cytoplasm; the cell number and composition of the stages of the seminiferous epithelium cycle resulted in a regular histological architecture; a sperm morphology (mutagenic) test was not significant; the sperm aneuploidy rate was not significant; and the sperm comet assay (*5*) showed DNA comets (in a low percentage, 3 to 4%, as in the controls), with a length more like that of the control sperm than that of the sperm radiated at a final dose of 8 rad. The number of bone-marrow micronucleated polychromatic erythrocytes (MPCEs) per 1000 PCEs (a mutagenic test) was never higher than 0.74 ± 0.27 in any experimental group. The overall view of our Seveso park findings suggests that the biological risk for TCDD does not differ significantly from that of other parks. This conclusion is supported by the TCDD liver concentrations of the animals caught in the park (4.3 ± 0.4 versus 7.2 ± 2.9 picograms per gram of fat and 29.5 ± 13.8 versus 41.3 ± 9.5 for Seveso versus controls in rabbits and house mice, respectively). The successful recovery of the 43-hectare area by the foundation of an urban park suggests Seveso as a study model for restoration ecology.

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1. A. P. Dobson, A. D. Bradshaw, A. J. M. Baker, *Science* **277**, 515 (1997).
2. A. Hay, *Nature* **262**, 636 (1976).
3. J. Krebs, *Ecological Methodology* (Harper & Row, New York, 1989).
4. H. M. Theobald and R. E. Peterson, *Toxicol. Appl. Pharmacol.* **145**, 124 (1997).
5. D.W. Fairbairn *et al.*, *Mutat. Res.* **339**, 37 (1995).
6. Supported by "Fondazione Lombardia per l'Ambiente."

CORRECTIONS AND CLARIFICATIONS

In the NetWatch item "Irish lass invents crypto code" (29 Jan., p. 599), the third, fourth, and fifth sentences of the second paragraph should have read, "Like RSA, Flannery's code is a public key method—part of the key is public, rather than kept secret by the two people using it—and hinges on the difficulty of factoring the product of two large prime numbers. But Flannery uses such products to encode a message using a different algorithm from RSA, one that involves 2-by-2 matrix multiplication. This approach is faster than RSA at higher security levels, Flannery says."

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