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Letters

Galactic fingers

The computer image accompanying "Cosmic Cartographers Find 'Great Wall'" (SN: 11/25/89, p.340) contains a number of clearly artifactual elements in the form of ray-like structures directed radially away from the vertex. These artifacts must have their origin in some kind of error in the method used to calculate distance from the Earth. Do they represent clusters of an unusual type of galaxy for which the method is inapplicable (due to large errors in the calculated distances), or do they call into question the existence of the sheet-like structure the astrophysicists claim to have discovered (by showing the range of uncertainties in all the calculated distances)?

Brian Gaulke
Bremerton, Wash.

Astrophysicist Margaret Geller, who codirected the survey, responds: "The pronounced radial 'fingers' along the line of sight ('ray-like structures') are clusters and groups of galaxies

This Week

- 68 Cold Dark Matter Builds a Great Wall
- 68 Sickie mice turn anemic
- 69 Making molecules that copy themselves
- 69 Drilling hits birthplace of Pacific plate
- 69 LDEF's space damage
- 70 Mouse model tests AIDS drug efficacy
- 70 Suicide thoughts drop in HIV positives
- 70 Fetal-cell recipient showing improvements
- 71 R&D budget: Civilian gains outpace defense

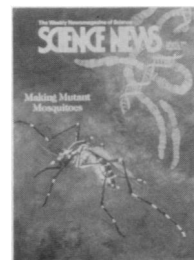
Research Notes

- 78 Behavior
- 78 Biomedicine
- 79 Earth Sciences
- 79 Environment

Articles

- 72 The Swat Team

Cover: If scientists could identify the gene for the mosquito's irritating whine, might they alter it in some way so that campers could get some sleep? Perhaps. But the first priority of recent efforts to manipulate mosquito genes is to strip the critters of their ability to spread disease. Preliminary results suggest that rationally mutated mosquitoes may become an important weapon in the global war against malaria and other insect-borne diseases. (Illustration: Taina Litwak)



Departments

- 67 Letters
- 75 Books

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bound together by gravity. If we could map the actual positions of galaxies in real, three-dimensional space rather than in the redshift space of our map, they would have approximate spherical symmetry. The elongation in redshift space occurs because galaxies move in the gravitational potential of the cluster or group. The orbital velocities carry the galaxies across the system many times (≥ 10) in the age of the universe. In fact, it is these 'fingers' which enable us to use Newton's laws to calculate the masses of galaxy clusters.

"Because the 'fingers' in redshift space are well understood, we can use statistical procedures to remove them from the maps. After removal, the large-scale patterns (the sheets and voids) in the map are unchanged."

Breakfast study defended

Professor Gill (Letters, SN: 11/25/89, p.339) would be correct in criticizing the design of our school breakfast program (SBP) study ("In-school breakfasts improve test scores," SN: 10/14/89, p.247) if we had presented the

data as *proof* of the hypothesis that SBP participation is associated with improved standardized test scores and rates of absence and tardiness. However, in our journal paper we were careful to point out that "this was not a controlled experiment, and thus causal inferences must be made with caution. Since the children's participation status was determined by self-selection, it was not possible to control for some potentially confounding factors, such as motivation." The data do demonstrate an association, which may be due to a number of factors, including a beneficial effect of SBP on performance.

We feel that retrospective studies, including the study of "natural experiments" such as ours, can provide valuable insight into important questions and may justify prospective controlled studies, which are usually more difficult and expensive to perform. We conclude in our paper that "further study of this important question is warranted, preferably using prospective controlled designs,

Letters continued on p.74

FEBRUARY 3, 1990

67