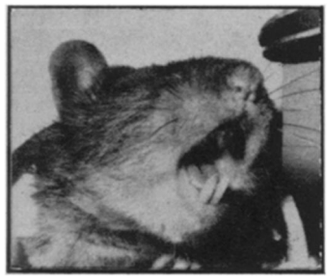
ZOOLOGY

Protecting phone cables from rodents



Squirrels, rats, gophers and woodpeckers chew and peck telephone cables with great enthusiasm, costing the Bell System hundreds of thousands of dollars annually, but Ma Bell scientists are out to prevent this destruction.

First they fashioned a device to measure the biting pressure of rodent wire eaters, which revealed that a squirrel can deliver a whopping 22,000 pounds-per-square-inch bite, a gopher 18,000 p.s.i. and a rat (see picture) 7,000 p.s.i. The researchers then determined how many bites rodents can inflict on a cable in a week. They found that gophers can produce 90,000, squirrels 45,000 and rats 18,000. Using this information the scientists performed simple calculations to see which cable sheathing material would be most resistant to rodent bites. They found it was stainless steel.

Lawn mowing and denizens of the green

Few home owners realize, as they run a mower over their lawns, that they are bearing down on a two-inch-high "forest" of insect dwellers. How does mowing affect these insects? John H. Falk of the Chesapeake Bay Center for Environmental Studies in Solomon's Island, Md., attempted to find out.

Falk mowed a lawn plot on Monday, then took samples of insects from that plot and from an adjacent plot. He then mowed the adjacent plot on Thursday and took insect samples from the same two plots. This way he could see how many insects were killed by mowing and whether any of them moved from a plot as it was being mowed in order to escape being killed.

As the researcher reported at the recent annual meeting of the American Institute of Biological Sciences, mowing did not kill the insects, nor was there a mass migration away from a plot as it was being mowed, as he had expected. In fact, the fruit fly did just the opposite. It left the unmowed plot to move to the freshly mowed one, apparently to feast on juice from freshly cut grass blades.

Africanized honey bees take over

Africanized honey bees, a hybrid of European and African honey bees, may be depriving native South American bees of a major food source—flower pollen—according to a report in the Sept. 15 SCIENCE.

David W. Roubik, an entomologist from the University of Kansas in Lawrence, manipulated the number of Africanized honey bees foraging on certain flowering plants in French Guiana, South America. The experiments showed that as Africanized honey bees became more numerous native bees became less abundant or harvested less pollen from flowers. The reasons why, however, are not clear. Roubik did not observe the Africanized bees displaying aggression toward the native bees.

Stalking the wood turtle

Charles J. Burt and David L. Collins of Ichthyological Associates, Inc., and the State University of New York at Albany have learned more about the habits of the wood turtle. The turtle is 100 percent aquatic from December to April, during which time it hibernates. Then it moves onto land and stays there until fall, when it returns to the water to breed. More sexually active turtles return to the water earlier than less sexually active ones.

PHYSICAL SCIENCES

Antiprotonic hydrogen

The study of "exotic" atoms has long been a specialty of the CERN laboratory in Geneva. In this context "exotic" means atoms in which an orbiting electron has been replaced by another particle with negative electric charge. Comparing the behavior of such replacement particles with that of the electron yields information about the forces exerted by the nucleus and its structure. If the replacement particle is subject to the strong subnuclear force that holds the nucleus together (as the electron is not) information about the nature of that force may be gained.

The *beau geste* particle for this kind of thing is the antiproton, which in its properties is the mirror image of the proton. Antiprotonic atoms of various sorts have been made. Now CERN reports the appearance of antiprotonic hydrogen, an antiproton orbiting a proton. This very simple exotic atom was very hard to make because direct annihilation reactions between the proton and antiproton tend to prevent it. The achievement is important because it could lead to an elucidation of the behavior of the strong force in the simple proton-antiproton case, although the CERN COURIER comments (Vol. 18, p. 257) that there is still a long way to go for that. The result also will be useful in studies of the "quasi-nuclear" states in which proton and antiproton are closely bound but do not annihilate, called "baryonium."

And the light said: "Let there be quarks"

When a piece of physics equipment is called an electron-positron colliding beam apparatus, that is what you expect: electron-positron collisions. And that is what you get. But you get more besides. You get collisions of light with light, photon-photon collisions. Photons (that is, synchrotron radiation) are continuously emitted by the electrons and positrons as they pursue their magnetically bent paths toward the collision region. Photons emitted near the collision are going in nearly the same directions as the electron and positron and may collide with each other.

In the Sept. 4 PHYSICAL REVIEW LETTERS, S. J. Brodsky and T. A. DeGrand of the Stanford Linear Accelerator Center, J. F. Gunion of the University of California at Davis and J. H. Weis of the University of Washington predict that such photon-photon collisions will become important as the energy of the experiments goes up (and it is on the point of taking a two- or three-fold leap). Photon-photon collisions will generate jets of particles just as the main collisions do. Photon-photon jets will be distinguishable from electron-positron jets, and they will be useful. Photon-photon collisions should be able to make quark-antiquark pairs and bring basic information about quarks and the forces between them.

2.7° blackbody: Reassessing its origin

The flux of radio waves that comes from all around us and seems to possess the spectrum of a blackbody at a temperature of 2.7°K is a relic of the earliest moments of the universe. So it is generally believed.

Maybe it isn't what people think it is, says Martin J. Reese of Cambridge University's Institute of Astronomy. That depends on the ratio of light to matter in the universe, which the theory does not specify. Reese proposes that before the galaxies formed there lived and died supermassive stars involving much of the matter in the universe, whose dead hulks are still with us. The light they gave off, jumbled together and thermalized into a blackbody spectrum, would be the microwave radiation we now see. If so, astronomers who seek information from it about the earliest moments may be disappointed.