

the pheromone. In response, more than 100 workers go to the entrance of the nest to lure their foes inside. Then, as many as 500 bees tackle each hornet, forming a ball around it. The bees vibrate and raise the temperature of the ball to a killer 47 C for about 20 minutes, the researchers find. The honeybees can withstand temperatures up to about 50 C, but not so hornets.

Such an intricate defense mechanism evolves as an arms race between predator and prey, notes Robert L. Jeanne of the University of Wisconsin, Madison. No other insect that he knows of kills with heat.

The honeybee also uses this hot tackle strategy against the hornet *V. simillima xanthoptera*, although fewer workers are needed to do the job, the Japanese researchers found in earlier studies.

Hornets stage mass attacks only in the fall, when they have many mouths to feed. "This food pressure may force the hornet into high-risk foraging," the team suggests.

Sometimes the hornets stage successful coups, particularly if they can invade the nest before their front line is destroyed. In these cases, they take over the nest and collect the bees' larvae and pupae.

When the researchers put a piece of paper that smelled of the hornet pheromone outside a Japanese bees' nest, 50 to 100 of the insects attacked the paper. However, immigrant European honeybees (*Apis mellifera*) in Japan failed to respond to the scented paper, the team reports. They also failed to mount a timely defense against the invader. Indeed, 20 to 30 hornets can kill a colony of 30,000 bees in 3 hours.

— T. Adler

DOE to pare costs—and sell some labs

On Monday, President Clinton issued a "decision directive" ordering the Department of Energy to rein in costs and redundancies at its 27 national laboratories. But he also firmly rejected one cost-cutting suggestion tendered earlier this year by an independent task force reviewing the labs: a 5-year transfer of Lawrence Livermore (Calif.) National Laboratory's defense activities to DOE's other two multipurpose, nuclear weapons laboratories.

That move would probably have tolled the death knell for the 43-year-old Livermore facility. Though nearly 75 percent of its work now involves nondefense activities—from climate change studies and biotechnology to medicine—Livermore derives almost 60 percent of its roughly \$1.1 billion annual budget from programs aimed at maintaining the health of U.S. nuclear weapons. Much of the facility's nondefense activities, therefore, rely on the

Mean streak: Hurricane season roars along

Robert W. Burpee, the new director of the National Hurricane Center in Miami, has endured a trial by storm. With a month still to go in his first season on the job, the Atlantic Ocean had produced seven hurricanes and six named tropical storms, making this year, as of Sept. 26, the third most active hurricane season in 125 years of records.

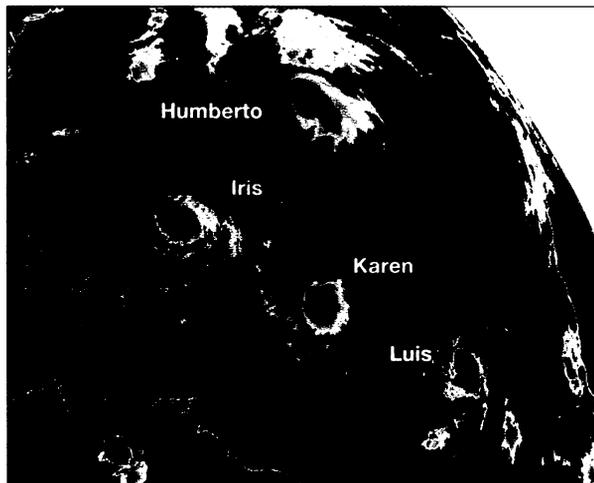
Burpee and other weather officials gathered in Washington, D.C., last week to review the storms thus far and to tout several major advances in hurricane forecasting. "This storm prediction season has been very, very good,"

said Joe Friday, director of the National Weather Service in Silver Spring, Md. "We're seeing the benefits of new observing tools, new computer models, and new procedures that we're using at the hurricane center."

One of the new tools, the GOES-8 weather satellite, gives the weather service more detailed images of the tropical Atlantic, the breeding ground for hurricanes. The hurricane center also started using an improved computer forecasting model this year, boosting the accuracy of its forecasts by 20 percent in some cases.

The weather service this summer flew its two P-3 aircraft on simultaneous criss-

crossing flights into several hurricanes, giving them more information than routine hurricane research flights usually



National Oceanic and Atmospheric Administration

Storm traffic: A satellite image from Aug. 30 shows two hurricanes and two tropical storms marching west. Remnants of another storm, Jerry, appear on far left.

produce. "These are the most complete pictures of hurricanes that we have ever obtained," said Hugh E. Willoughby, acting director of the Hurricane Research Division in Miami.

Hurricane reconnaissance will improve next year, when the weather service acquires a Gulfstream jet. The jet can fly at 45,000 feet, much higher than the turbo-propeller P-3s. The lofty vantage point will enable scientists to survey the tops of hurricanes, where upper-level winds help steer storms.

— R. Monastersky

principal deputy assistant secretary for defense.

Livermore and the other two DOE defense centers—Sandia National Laboratories and Los Alamos (N.M.) National Laboratory—each plan to tackle different parts of the stewardship activities.

O'Leary says it doesn't seem very cost-effective to put a U.S. test ban "at risk by simply folding up a lab [Livermore]." But she acknowledges that administrative activities have bloated DOE's laboratory budgets.

By the end of next month, her agency hopes to announce details of how it plans to cut \$1.6 billion from the labs' spending over the next 5 years—or some 13 to 18 percent, after accounting for inflation.

Moreover, O'Leary notes, "there are willing purchasers" for some of the agency's smaller, single-purpose laboratories. By next spring, she says, DOE will probably have negotiated the sale of at least two.

— J. Raloff