

## A billion-dollar research cut

The ax landed on Defense Department research this week, when the House lopped off a whopping \$5.3 billion from the \$75.2 billion Defense had requested for fiscal year 1970. Only one previous cut has exceeded it: the \$6.3 billion reduction right after Korea.

Of the \$5.3 billion, which is an over-all reduction, at least \$1 billion will be taken out of the \$8 billion research and development pot. This was the amount specified in the previously approved authorization, and there's no telling how much more will be taken out by the time the Senate acts.

Research that cannot be justified by rigorous standards of relevance to national security will be the first to go. In a letter to Sen. Mike Mansfield (D-Mont.), majority leader and a member of the Appropriations Committee, Deputy Defense Secretary David Packard has formally agreed to abide by the 1970 Military Authorization bill and carry out basic research only if it has an apparent direct and clearly documented relationship to military functions. This means that if any basic research program can't prove it has military relevance, it will be eliminated.

**One sure casualty** will be Project Themis. Started in 1967 as part of a Government-wide effort to establish centers of research excellence in universities, Themis encouraged university researchers to submit research proposals that Defense would fund. Themis survived, to become a target of student dissent, even when civilian-run center-of-excellence efforts by the National Science Foundation and the National Institutes of Health were being cut. The new cutbacks are expected to decimate the \$30 million program and preclude any new research starts under it.

Although priorities will determine what else is eliminated, there is still concern about the long-range effects.

"We're not going to have the benefit of as broad a research program as we'd like to have," says one Pentagon research manager. "It might take five years to find out we didn't support enough research in a particular area. You don't always see the results until five to ten years later."

To insure that the right projects are preserved, Defense's research chief, Dr. John S. Foster Jr., has invited the National Academy of Sciences to examine some of his basic research projects to see if they are far enough removed from hard military applications to be

dumped. As a result, one of the oldest debated questions in scientific research will be brought in: What is basic research and what is applied research? The difference between the two is often indistinguishable since for practically any basic research project some practical application—even if remote—can be conceived.

"Exactly what is mission-oriented and what is basic is fuzzy," says a National Academy member involved in the review. "It's awfully hard to set up criteria. For years, we've been arguing what's basic and what's applied."

And now that millions of dollars are involved, the question is more than one of semantics.

The next move will come from the Senate, which must vote on the budget recommendations of its Armed Services and Appropriations Committees. The Senate is expected to emulate, if not exceed, the House, and a joint conference will work out any differences.

## FEDERAL AID

### Ecology and airports

High density airport operation has already resulted in the virtual strangulation of airport services and dangerously glutted air space (SN: 5/31, p. 531).

In the rush to aid the airlines and operators of private aircraft a new airport development bill now in the Congress may supply up to \$2 billion of Federal money in the planning and building of new facilities and expansion of present airports.

The new measure would establish a trust fund by an initial appropriation of \$150 million in 1970. User taxes would expand the fund.

But indications from the U.S. Department of Transportation suggest that new funds may be allocated selectively to encourage airport developers to observe local environmental standards.

Federal review of prospective airport sites may include studies of potential flight patterns and traffic volume over areas vulnerable to the effects of aircraft noise, and the effects of airport land use on over-all adjacent land quality.

The bill, passed by the House and now in the Senate, does not mention ecological review. But Transportation Department officials indicate that the new funds could be used as a spur to force local considerations of environmental quality. One possible application might be to limit the use of the recently constructed jet training airport in the Florida Everglades (SN: 10/4, p. 296).

## Effective antibiotics

In any consideration of the high cost of drugs, attention inevitably focuses on the relative merits of brand name versus generic products. The argument favoring the generally low-cost generics says that if two drugs are chemically identical there is little reason to pay for the more expensive brand-name version. Brand-name drug manufacturers counter by declaring that chemical identity does not guarantee equal effectiveness (SN: 4/22/67, p. 382).

To resolve the argument in any specific instance it is necessary to test the products in people. This is a tedious and expensive procedure. The Food and Drug Administration does not require it and drug houses seldom undertake it, unless the stakes are high enough.

**In the case** of Terramycin, a widely used antibiotic, the stakes were high. So its producer, Chas. Pfizer Co., ran a series of comparative blood studies to show that generic versions of Terramycin, called oxytetracycline, are not equivalent in patients in spite of the fact that they passed FDA's chemical tests. Terramycin sells for approximately 30 cents a capsule; the generic product costs about half that.

Pfizer submitted its blood-level data to FDA this summer. Then FDA conducted its own tests, concurred with the drug company's position and last week recalled nearly 40 million capsules of oxytetracycline made by eight manufacturers.

**The agency said** the capsules to be called off the market are of questionable medical value because the oxytetracycline may not enter the blood at levels sufficiently high to combat infections. Pfizer's brand-named Terramycin was untouched by the FDA action. So were the oxytetracycline capsules produced by the Rachelle Laboratories of Long Beach, Calif., and by West-Ward, Inc. of New York.

Pfizer scientists first discovered Terramycin in 1949, and the company was the sole distributor of the antibiotic in the United States until its patent ran out in 1967. Then competing firms entered the market with generic versions. Subsequently, to protect its investment, Pfizer researchers undertook the comparative studies, measuring blood levels in patients given one of 16 lots of oxytetracycline, against their own product. Each of the 16 lots had been FDA-certified on the basis of chemical tests for content—250 milligrams of drug—and purity. Seven lots produced blood levels below the minimal acceptable levels and none produced levels as high as Terramycin.

Pfizer attributes the better performance to differences in manufacturing procedures.

According to FDA Commissioner Dr. Herbert L. Ley Jr., his agency "has presented a set of standards for these products to all firms. The capsules that will remain on the market meet those standards." No new batches of oxytetracycline will be certified unless manufacturers can demonstrate ade-

quate blood levels with clinical tests.

The last major victory for brand-name producers in the equivalency battle was in 1967 when Parke, Davis & Co. in Detroit showed that its brand name antibiotic, Chloromycetin, was clinically superior to generic versions of chloramphenicol, again on grounds that the generics did not reach therapeutic levels in the patients' blood (SN: 12/9/67, p. 559). □

## HURRICANE SEEDING

### Shrinking Debbie's eye

Four months ago Hurricane Debbie was seeded with silver iodide crystals to help determine whether hurricanes can be modified (SN: 8/23, p. 153). Then the scientists went into a huddle with their data to sort out effects of their effort.

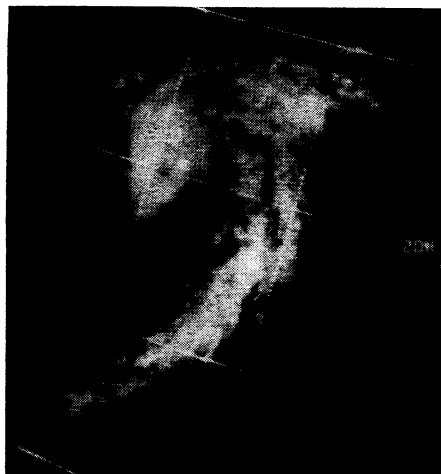
Last week the results were announced. The news was encouraging.

The scientific evidence, although circumstantial, strongly suggests that the seeding helped reduce the force of the hurricane.

Five hours after the completion Aug. 18 of the five aircraft-seeding passes, Debbie's winds had diminished 31 percent. A day later on Aug. 19, when no seeding was conducted, the winds intensified again, and five hours after the second day of seeding, on Aug. 20, the winds again decreased, this time by 15 percent.

**This does not** prove cause and effect, but it does indicate such a relationship.

Of past hurricanes studied, says Dr. R. Cecil Gentry, director of Project Stormfury, only about one in 11 has shown the rate of pressure rise in the hurricane's core that accompanied the reduction of winds in Debbie on the first day. And the drop in wind speeds on Aug. 20, though smaller, would not be expected in more than a half or possibly a third of the storms with no modification experiments, says



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*Debbie: Man may have modified her.*

Dr. Gentry.

"The data suggest we did modify the hurricane," he says.

Scientists of the Commerce Department's Environmental Science Services Administration hope to be able to say within the next two to four months whether the experiment did indeed cause the weakening of the hurricane's winds. By then they will have completed study of photographs taken from the ATS-III satellite and of radar pictures taken aboard the project aircraft. And they will have completed analysis of the pressure, temperature and

moisture measurements taken by the aircraft.

If the changes in Debbie were accomplished by the seedings, an advance of considerable importance will have been achieved.

Although the death toll from hurricanes in the United States has been steadily declining in the last half century as prediction techniques improve, their toll in property damage has been rising steadily as hurricane-prone areas become more built up. Damage in the years 1965-69 totaled an estimated \$2.4 billion in the United States.

The experiments on Debbie, says Dr. Gentry, "suggest so strongly that hurricane modification was accomplished" that further confirmation should be sought as soon as practical.

He says he won't be absolutely convinced until seeding on two more hurricanes produces results comparable to those with Debbie. Then he and others feel it would be proper to think about going after hurricanes routinely.

## BREEDER REACTORS

### Three plans approved

Earlier this year, the Atomic Energy Commission invited industry to submit proposals for the construction of a prototype liquid metal fast breeder reactor (SN: 6/14, p. 572).

Last week, three semifinalists — Atomics International, General Electric and Westinghouse—had their plans approved.

Each of the three will receive \$1.3 million for the 12-month paper study to define the technical and economic risks for the total project. Based on the results, it is expected that one of the three will be selected to build a 300 to 500-megawatt demonstration plant sometime in the 1970's.

The concentrated efforts in breeder reactor development are being spurred on by the increasing concern about the size of uranium reserves, coupled to the high cost of power from natural reactors.

The total cost of the project definition phase, as it is called, is estimated at \$8.2 million. The remaining \$4.3 million the three companies will have to bear themselves, along with the more than 85 public and private electrical utilities associated with them in their efforts.

**Although the three** proposals submitted are for the same type of breeder reactor, there are significant differences in the features of the reactors proposed. For example, General Electric favors what is called a pot system, where the uranium core, the pump, the piping and heat exchanger are all in a big tank filled with sodium which

*Debbie's winds, on both sides of the eye, weakened markedly after seeding.*

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