tried to keep quiet for the last year," because it seemed proper for younger scientists to refine the work he started. "We knew at the time that the answer we had [in 1965] wasn't good enough," he said, "but we had an answer, and the funding dried up." He predicted that the revision could be done in a year or two.

The physicists working on the new estimates seemed to be in general agreement on this point as well. George Kerr of Oak Ridge said: "A couple of years ago there were large discrepancies in the dosimetry" when different blast data were used to estimate effects. "These discrepancies have been worked on. . . . The end is now in sight. We know what the problems are and they can be solved in a timely fashion." He later explained that he meant 2 years. Loewe of Livermore and Dean Kaul of Science Applications, Inc., of Schaumburg, Illinois, who have made independent revisions of the data, both seemed confident that their work would soon be finished.

There was general agreement on which tasks should be undertaken first. Step one is to determine more precisely the radioactive output of the bombs using data which have been kept classified until now. Work on this has begun at the Los Alamos National Laboratory. Computers will be used to "transport" the radiation through models of the atmosphere at Hiroshima and Nagasaki. Small adjustments may be made to take into account the shielding provided by natural terrain. Then the big problem appears. The effects of shielding provided by buildings will have to be completely reexamined. Last of all, the physicists will have to calculate the shielding effect of human tissue.

No great changes, other than those already mentioned, are expected to come out of most of this work. However, the building factor may produce something unanticipated. For example, Michael Bender, a radiobiologist at the Brookhaven National Laboratory, said he was surprised to learn in conversations at this meeting that a "substantial portion" of the people in one category in Nagasaki may have been tagged with wrong doses because of an arbitrary decision about buildings. When the original calculations were made, it seemed too difficult to estimate the effect of shielding in every case, so that, as in one particular example—a large group of workers in the Mitsubishi steel factory in Nagasaki—people were at times simply assigned the dose they would have received had they been standing outside. The Mitsubishi building was made of steel and concrete and contained some heavy machinery. The people inside received considerably smaller doses in fact than they were assigned. Because so many were in the factory, it is possible that they may have skewed the Nagasaki data, understating the effects of the radiation in the middle range of doses.

In addition, several researchers, including Jess Marcum of R & D Associates, of Marina Del Rey, California, have concluded that the effects of building shielding were generally understated throughout the old dose calculations. A preliminary look, according to Loewe and Marcum, suggests that structures absorbed 1.6 times more gamma radiation than was thought.

It is important to note that the preliminary guesses about the impact of this research do not take into account the errors in building shielding. This applies, for example, to Charles Land's study. He says that he thinks that "they haven't got the shielding done yet," and believes it is too early to make any general statements about the size of the change in overall risk estimates. As shielding factors are reexamined, doses for individual survivors may change dramatically, shifting data points up and down the scale in an unpredictable way. Only after all of these individual cases have been revised will it be possible to get a clear picture of the entire Hiroshima-Nagasaki experience.—ELIOT MARSHALL

Police Seize Primates at NIH-Funded Lab

Young assistant blows the whistle on employer, claiming filth and neglect in the monkey room

In what is believed to be the first raid of its kind, the Montgomery County police in Silver Spring, Maryland, recently invaded a government-funded animal research laboratory and spirited away 17 allegedly abused monkeys.

The police acted on the basis of an affidavit signed by four scientists who had inspected conditions at the Institute for Behavioral Research at the behest of a volunteer student who had worked there since last May.

The National Institutes of Health, which has funded the institute over the past 11 years, immediately launched an investigation of its own to see if its guidelines on the care of laboratory animals have been violated.

Viewers have used the word "appalling" to describe the conditions in which the monkeys were held. However, the institute's chief investigator, Edward Taub, a physiological psychologist, insists that the charges contained in the affidavit are "distortions," that his monkeys, crab-eating macaques, are very healthy and conditions are routine for the type of work being done.

For the past 22 years Taub has been involved in research on the effect of cutting the nerves, or deafferentation, of monkeys' limbs, for which he has received steady grant support from the National Institute for Neurological and Communicative Disorders and Stroke (NINCDS). The purpose is to gain a better understanding of how to rehabilitate stroke victims. Work has also been done on biofeedback with monkeys, with orange juice used as reinforcer, in an attempt to develop a monkey model of biofeedback learning. The institute also houses a biofeedback clinic for sufferers from Raynaud's disease, a disorder in which circulation to the extremities is impaired.

Last May Taub took on as a volunteer worker Alex Pacheco, a master's student at the University of Maryland. Pacheco is also a founder of an animal rights group called People for Ethical Treatment of Animals. He had no prior experience with laboratory animals but he became increasingly distressed over the lot of the monkeys. In late August, while Taub was away on vacation, Pacheco took some photographs and brought them to Michael Fox, a veterinarian and director of the Humane Society's Institute for the Study of Animal Problems.

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Subsequently, Fox and three other experts, including Geza Teleki, a primatologist who works at George Washington University, visited the laboratory. Fox and the other scientists signed the affidavit that was given to the police.

Fox says he "found the conditions, to put it mildly, appalling." Teleki says that "I have never seen a lab that compares to this in every respect—condition of the facilities, maintenance of the animals, and lack of rudimentary veterinary care." According to Fox, there were "torn limbs, great rips in their arms, and filthy cages." Two of the animals, he said, had chewed off fingers on their denervated hands. One had a broken arm that had been untended and showed signs of infection. There was "old filthy bandage material matted into the floor, and moldy feces in the corners," according to Fox. Broken wires protruded into some of the cages so the animals could lacerate themselves. Fox says that the ventilation was inadequate, and one duct led directly to the area where human patients are treated. The scientists also say they found garbage bins filled with formaldehyde in which floated the decaying bodies of monkeys being kept for histological studies. The surgical suite was found to be filthy and the drugs in the refrigerator were at least a year out of date. Pacheco has also claimed that the monkeys were subjected to pain and that he was "told to torment and frustrate them and watch their reactions."

"What really curdles me," says Fox, "is that this place year in and year out has passed USDA [Department of Agriculture] inspection." The Animal and Plant Health Inspection Service of the USDA makes periodic unannounced inspections of animal facilities to see if they conform to the requirements of the Animal Welfare Act of 1966. The most recent inspection was in April, when the inspector reported a few minor cleanliness-related problems such as peeling paint. The facility was reinspected on 15 September, 4 days after the animals had been removed, and only three "minor deficiencies" were noted by the USDA inspector.

Taub denies almost all the allegations of his former worker and acknowledges only that "a situation did develop in the lab relating to cleanliness." He says he left for a 2½-week vacation on 21 August during which people came in to feed and clean only half the time they were supposed to. A subordinate failed to notify Taub of the problem because he didn't want to disturb his vacation. "This is what is technically called a housekeeping problem based on personnel breakdown," says Taub. The laboratory has only one full-time employee, a graduate student, besides Taub, and six part-time workers. Taub told *Science* that when he returned from vacation he was too busy with paperwork to inspect the animal quarters. The next thing he knew he was "standing helplessly by" while the Montgomery County police removed all his monkeys as well as samples of food and feces and an assortment of records, including slides and videotapes. "If they can do this in my lab on the basis of unconfirmed and distorted evidence . . . they could do that in virtually any lab in the country," says Taub.

As for the allegations in the affidavit, Taub claims that the lesions on the monkeys are only those that are unavoidable in work where the useful limb is bound to the body in order to compel the animal to use the deafferentated one. No pain is involved. Otherwise, he said, "we have an extremely healthy colony" with no diseases and only one death in the last 2 years.

He said that the bodies kept in the formaldehyde vats were not decaying because bodies cannot decay if they are in formaldehyde. Taub acknowledged the "stench" described in the affidavit but said that is the way things are with monkeys. He said no surgery has been done in the past 2 years, which is why all the drugs are out of date.

No criminal charges have been filed. A police spokeswoman said a "nationally renowned expert on primates" was being flown in to examine the monkeys after they have settled into their temporary facility.

At NIH, according to William Dommell of the Office for the Prevention of Research Risks, the reaction has been one of "total surprise." When the last grant application from Taub was reviewed, in early 1979, officials paid a visit to the site and said the facility was well suited to the project. The institute's own animal care committee, whose members were selected by the institute and approved by NIH, last inspected the premises in November 1980 and registered no complaints. Taub, who has a $60,000 grant from NINCDS this year, is regarded as "an outstanding behavioral scientist" who does "frontier work" in his area, according to Michael Goldberger, a neuroanatomist at the Medical College of Pennsylvania who does similar work with cats. Taub is past president of the Biofeedback Society of America and was on the founding committee of the Federation of Behavioral Medicine Societies.

Teleki and other scientists fear that this case will be used by some people to increase antagonism between researchers and animal rights activists. That is why he emphasizes that the problems with the institute have to do with basic handling of the animals, and not with the procedures called for under the research protocol.

Fox and Teleki both say that the case illustrates the need for NIH to adopt new requirements for laboratories that receive federal money.

The monkey seizure will undoubtedly supply grist for witnesses at hearings on laboratory animals to be conducted this month by the House Committee on Science and Technology. Several new pieces of animal protection legislation have been introduced, including a Research Modernization Act, which would encourage investigators to use computer simulations, tissue samples, and invertebrates instead of vertebrate animal subjects.—CONSTANCE HOLDEN

Research Without Animals

A new Center for Alternatives to Animal Testing, which its director says is "unique," is being established at the Johns Hopkins School of Hygiene and Public Health with the aid of a $1-million grant from the Cosmetic, Toiletry and Fragrance Association. The director will be neurotoxicologist Alan Goldberg of Johns Hopkins.

The center, which will have both intramural and extramural research programs, will conduct basic research on alternatives to the use of animals in product testing. The early focus will be on identifying the biochemical and cellular mechanisms responsible for tissue damage in the testing of cosmetics. This could lead, for example, to elimination of the controversial Draize test, in which cosmetic products are applied to rabbits' eyes to test for irritation.

The center will eventually branch into other areas as it receives funds from additional sources.—CONSTANCE HOLDEN