diation there is lower than in most U.S. cities.

One solution to the lingering problem on the northern part of Rongelap Atoll, Brown says, would be to spread high-potassium fertilizer, blocking the uptake of cesium. A single application to the worst two islands, according to DOE official Rudolph, would cost "a few hundred thousand dollars" and wipe out the food contamination problem for 5 years. This would buy time, allowing the radioactive cesium to decay to safer levels.

Rongelap is asking instead for a new $6.6 million analysis by a Phoenix, Arizona consulting firm that may lead to a broad "rehabilitation" plan. An independent study prepared last year by Henry Kohn of Berkeley, California, who found Rongelap already safe for habitation "by adults," has been rejected as "unacceptable" by Anjain because he thinks it lacks credibility. Anjain claims, for example, that Kohn did not cooperate fully with the critics of DOE chosen by Rongelap as watchdog-advisers.

One of them, Bernd Franke, drew attention to the embarrassing 15-year delay in resolving the conflict on plutonium dose estimates. DOE officials explain the delay by saying it took this long for Brookhaven to determine what went wrong with its urine sampling and test methods and to develop new ones that would give accurate readings. The result is a new "fission track etch" technique which can measure plutonium in infinitesimal amounts, down to the level of atocuries (less than a quadrillionth of a curie). DOE's Rudolph says that it would have been "irresponsible" to advertise earlier, unverified data.

Franke responds: "I don't understand how scientists could sit there for 15 years and take samples" without telling the Rongelapese about the results, even if they were wrong. "They were the best data available at the time." Franke also challenges DOE's view that there are no "hot spots" of plutonium on the atoll today.

Franke also hit a nerve when he pointed out that the U.S. government is thinking of decontaminating its own military base on nearby Johnston Atoll to a cleaner standard than it has proposed for Rongelap. A mining machine is being used there to sieve plutonium out of soil where rockets carrying radioactive parts exploded. When Rongelap's agents asked about the new cleanup standard, the director of the Defense Nuclear Agency, Vice Admiral J.T. Parker fired off a letter in April saying that this was "nothing more than a test objective for a limited experiment evaluating a novel cleanup technique," not related in any way to health or safety standards. ■ ELIOT MARSHALL

Compromise in Sight on Animal Regulations

Rules governing dogs and primates are being revised for the third time; less financial distress for scientists predicted

FOR THE PAST 4 YEARS, the Department of Agriculture has been struggling to figure out the meaning of two laconic provisions on laboratory animals that appeared in the 1985 amendments to the Animal Welfare Act. And while the department's officials have been trying to comply with the law, researchers have been looking on with apprehension, for the provisions could prove extremely—perhaps unsupportably—costly for some types of biological research.

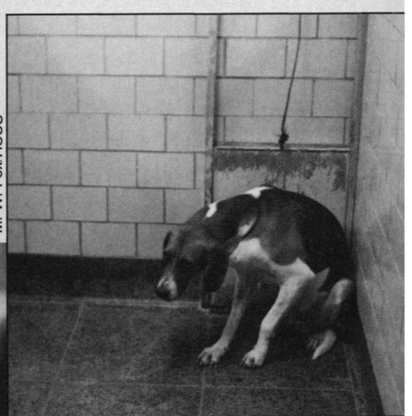
The measures, which require that laboratory dogs be exercised and that primates be kept in an environment conducive to their "psychological well-being," were passed without benefit of floor discussion or any subsequent clarification from Congress. The agriculture department, until recently, has responded by drafting regulations that specify in detail the types of animal facilities and exercise regimens required. The estimated price tag: $250 million for new monkey and dog facilities alone.

But finally there's some good news. At a conference held recently by the Scientists Center for Animal Welfare (SCAW), animal researchers agreed that all the signs are pointing to a compromise that will not only be good for dogs and monkeys but will also cause scientists considerably less distress. Says Andrew Rowan of the Tufts University School of Veterinary Medicine, "things are moving in the right direction."

At the center of the debate is the Animal and Plant Health Inspection Service (APHIS), the agriculture department agency that is responsible for interpreting the vague provisions of the Animal Welfare Act. It is writing regulations that will apply to all research on animals funded by the federal government, as well as animal care by licensed breeders and dealers.

APHIS made two initial attempts at drafting regulations, the latest of which was published in the 15 March *Federal Register*. In addition to the specific provisions for dogs and primates, they also contain detailed specifications about laboratory inspections, animal care committees, and animal care and use.

But these efforts have drawn howls of



M. W. Fox/HSUS

Michael Fox

Social exercise. *Regulations are expected to reflect research showing that socialization is better than exercise in keeping dogs healthy.*

protest from scientists who have criticized APHIS, among other things, for paying more heed to public opinion than to their own judgments. The total cost of the draft regulations to the private sector has been estimated at $1 billion ($885 million in initial outlays, $207 million in annual operating expenses), including $250 million for the dog and primate facilities. (*Science*, 4 November 1988, p. 662). Animal researchers say this would render much research unaffordable.

Comments on the proposed regulations are not yet in (the deadline was 13 July), but they are likely to send APHIS back to the drawing board. And as it redrafts the regulations for a third time, it will have the benefit of some new research findings.

Dale Schwindaman of APHIS noted that at the time the law was passed, there was little research to guide implementation. But over the past few years researchers have been coming up with empirical findings on what it takes to keep dogs and monkeys fit and happy. In a word, they have established that, as with humans, a satisfying social life is more important than one's exercise regimen or the spaciousness of one's apartment.

APHIS, therefore, is moving toward definitions of "psychological well-being" and "exercise" that reflect these findings. For primates, it means that the best thing to keep a monkey happy is living with another monkey (*Science*, 30 September 1988, p. 1753). When this is unfeasible, supplying an interesting cage environment is what's important; bigger cages are not. Said Schwindaman, "we at USDA look on psychological well-being as environmental enrichment."

As for dogs, the big news at the SCAW conference was that everyone seems to agree now that the best interpretation of the exercise requirement is socialization—with other dogs and, especially, with human beings.

The financial stakes of the proposed dog regulations are higher than those for primates. About 170,000 dogs are used in research each year, more than three times the number of primates, according to Thomas Wolfle of the National Academy of Sciences Institute for Laboratory Animal Resources. Dogs are heavily used in toxicity studies as well as cardiovascular research and experimental surgery. About one-third are purpose-bred (as opposed to pound animals); most are beagles because of their modest size, short hair, and docile temperament.

Despite greater numbers, there has been far less research on canine than on primate well-being. But speakers reported on several recent studies showing that dogs are not keen on exercise for its own sake and that socialization is what makes them feel good. For example, two studies by researchers at Smith Kline & French found that neither cage size nor exercise opportunities had any effect on immune function or exercise levels. Dogs were most moved to activity when humans were present. Said the researchers, "it is apparent that human contact is the single most consistent and important factor in encouraging dogs to be active." Otherwise, "dogs that are well fed and content do not routinely exercise." Another beagle study showed that regular stints on a treadmill did nothing for dogs, judging by measurements of muscle fitness and heart rate.

Partly as a result of such findings, speakers at the SCAW conference said APHIS is favoring a new approach. Instead of specifying in excruciating detail "design standards" such as cage sizes and exercise regimens, APHIS now appears to be moving toward a more flexible approach that will leave more to the discretion of institutions.

This shift also results from the fact that, of late, officials from agriculture and the Public Health Service have been trying hard to get in tune with one another. APHIS now apparently intends to follow the model established by the National Institutes of Health, which has already written guidelines for the animal research it funds. The NIH rules are cast in the form of "performance" standards—that is, they designate the desired results, in the form of animal health and happiness, instead of detailed design standards that would incur heavy expenses without guaranteeing the required ends. APHIS inspections, said Schwindaman, are going to "get away from the tape measure kind of thing. . . . The trend is going to be toward performance-based standards."

PHS veterinarian John G. Miller gave several examples of what NIH means by performance standards (which would be applied to all parts of the regulations, not just dogs and primates). In personnel training, it would mean a stipulation that people are "appropriately qualified and experienced" in place of detailed training requirements.

The regulations are coming at a time when many researchers say things are already moving in the indicated directions. For example, about half of research dogs are kept in single cages, according to Wolfle, but the trend now is toward keeping them with other dogs in runs or pens. (The regulations say the animals "must be maintained in compatible groups" unless solo caging is indicated for health or problems of aggression.) Schwindaman said that he thought single caging for dogs will "probably" become "a thing of the past."

There remains a great deal to be ironed out before final regulations can be promulgated. Surprisingly, things are moving in a direction that even animal welfare advocates seem to approve. Says Michael Fox of the U.S. Humane Society, "I got the feeling that the problems were really being recognized." And a PHS official predicted that when all the issues are finally resolved, "the scientific community is going to be overjoyed."

■ CONSTANCE HOLDEN

Cosmetics Firms Drop Draize Test

Two major cosmetics companies, Avon and Revlon, have announced that they will no longer use the controversial Draize test to gauge the safety of their products. The test, which uses rabbits' eyes to measure irritancy, has been a major target of animal activists for the past decade.

Avon Products, Inc., said in April that it will henceforth rely on a new in vitro test it has developed, harmless tests on people, and a computerized database.

On 30 June, Revlon Inc., which closed down its animal testing facilities in 1986, announced that it will no longer use animals in product testing. Revlon, which for 6 years funded the Laboratory Animal Research Center at Rockefeller University, says it has put $3 million into research on nonanimal alternatives since 1980.

Both companies have reduced animal use more than 90% in recent years. Avon is now employing Eytex, an in vitro method which it describes as a "biochemical matrix representing predominant components of the eye including mucopolysaccharides, proteins, and referenced salt solutions." In categories where Eytex doesn't work, the company will use proven formulations until new alternative tests are available.

Noxell Corporation is also moving toward elimination of animal use. Last January the company began using the agarose test, involving the application of cosmetics to human or animal cells in a culture, which it predicts will replace the use of rabbits in 80% of cases.

Scientists say that no one procedure is adequate to replace the multipurpose Draize test. Therefore, says New York activist Henry Spira, who launched the anti-Draize movement, companies "are seeking alternatives that will work for their product line, instead of looking for universal alternatives." ■ C.H.