

Scientists Implicated in Atom Test Deception

A recent court opinion describes how the government proved that atom testing did not kill sheep in Utah, despite some evidence to the contrary

Officials at the Atomic Energy Commission (AEC) had a serious problem on their hands in May 1953. Two atomic bomb blasts at a test site in Nevada had rained fallout on ten herds of sheep grazing nearby. Within a short period, roughly an eighth of the ewes and a quarter of the lambs died, with many showing signs of irradiation. Word of the deaths spread quickly among the small towns of southern Nevada and western Utah, and complaints were made to the AEC.

Motivated by a desire to prevent general alarm, the AEC launched an extensive investigation. A team of veterinarians was dispatched to collect thyroid tissue and bone samples from the surviving sheep for radiological analysis at the AEC laboratory in Oak Ridge, Tennessee. Nuclear scientists at the weapons laboratory in Los Alamos, New Mexico, exposed some sheep to intense beta radiation in an attempt to duplicate the lesions seen on dead animals. Other scientists at a federal laboratory in Hanford, Washington, studied the effects of radioiodine on ewes and lambs, and prepared a report for the AEC.

Almost immediately, the investigation began to unearth damaging information. Two veterinarians concluded that lesions on surviving sheep were similar or identical to those produced at Los Alamos. "It is my opinion that radiation was at least a contributing factor to the loss of these animals," one said in a report to the AEC. In addition, the Hanford sheep experiments produced symptoms identical to those observed in the stricken herds. Ewes that ingested high levels of radioiodine produced lambs that were stillborn, stunted, weak, or stupid, just as ranchers had reported.

The AEC elected, however, not to reveal these potentially compromising observations. Critical data from the Hanford tests were suppressed when a summary was prepared for public release. And intense pressure was brought to bear against the veterinarians—through letters and personal visits from AEC employees—in an effort to make them revise their conclusions.

By these means, the AEC was able not only to avert any public outcry but also to avoid paying damages to the owners

of the sheep. After a 1956 trial, federal Judge A. Sherman Christensen dismissed the owners' demand for compensation, citing data from the public summary of the Hanford tests and noting that one of the veterinarians had indeed changed his mind. "Some of the best informed experts in the country expressed considered and convincing judgment that radiation damage could not possibly have been a cause or a contributing cause," the judge concluded. There was no indication then that some of those experts, as well as the government's attorneys, were privy to contrary information.

It was not until recently that the extent of the AEC's deception became apparent. In 1979, the governor of Utah obtained the release of previously classified federal documents on the sheep deaths. Additional information became available during a series of congressional hearings that year. Evidence of deception in the conclusions of the experimental sheep report was discovered and reported in 1980 by Harold Knapp, a high-level defense analyst working in his spare time (*Science*, 15 October, p. 266). The discoveries aroused the interest of the sheep's owners, and ultimately they decided to renew their claim before Judge Christensen, who at 77 still presides over a federal court in Salt Lake City.

In a ruling on 24 August, Judge Christensen said that the AEC had indeed misrepresented the facts, and he identi-

fied several attorneys and scientists who had helped to perpetrate a fraud upon his court. The ruling, which also ordered a new trial, has been appealed by the Justice Department. The government will, however, have a tough time explaining away damaging evidence in congressional and trial testimony, as well as in government documents now in the public domain.

The evidence suggests that the sheep deaths occurred at a vulnerable time for the bomb testing program. One of the two blasts suspected of causing the deaths also deposited a large amount of fallout on the town of St. George, Utah. Residents were unsettled by an AEC request that they go indoors until the radiation levels receded. "A serious psychological problem has arisen," said commission member Eugene Zuckert at a meeting in Washington 2 days later. "In the present frame of mind of the public, it would take only a single illogical and unforeseeable accident to preclude holding any further tests in the United States." Zuckert was then unaware that thousands of sheep were dying in the path of the fallout.

Bad news arrived shortly afterward in reports from Robert Veenstra, a veterinarian stationed at a Navy laboratory in San Francisco, and Robert Thompson, a veterinarian in private practice in Los Alamos. Both had visited the area surrounding Cedar City, Utah, at the request of the AEC, and both reported that the dead sheep appeared to have been killed by fallout. "There is no doubt as to the origins of the lesions on the sheep," Thompson told the AEC in a letter. The lesions were identical to those that appeared on cattle after the famous Trinity blast, "both macroscopically and in the laboratory," he said. Reports from other veterinarians on the scene were less certain, but Veenstra and Thompson's findings were bolstered by a discovery of potentially significant radioiodine in the thyroids of surviving sheep.

The AEC promptly classified Veenstra's report, and one of its officials, Paul Pearson, sent him several letters seeking his reconsideration. Thompson, meanwhile, was asked to come to a meeting at the Los Alamos laboratory, ostensibly



Judge Christensen

"fraud practiced upon the court"

called to analyze an experiment involving the deliberate radiation of sheep. According to minutes of the meeting prepared separately by three participants, the results were preliminary and no consensus was reached. At the end of the meeting, however, Gordon Dunning, a health physicist in the AEC's Washington office, said that he wanted a unanimous statement that fallout was unlikely to have caused the deaths. "This statement, claimed Dr. Dunning, is required before Commissioner Zuckert will open up the 'purse strings' for future continental weapons tests," one of the notetakers said. "We did not all agree," said another, but they signed the statement anyway after Dunning promised that it was only for internal AEC use. Dunning, who is retired and living in Green Valley, Arizona, declined any comment.

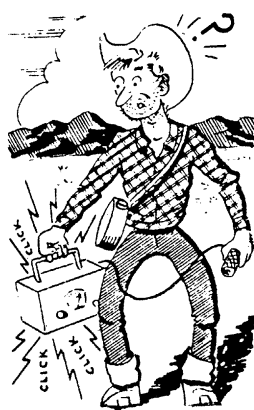
In roughly the same period, Thompson received a phone call at his veterinary lab from Steven Brower, a Utah county agriculture official, who asked for a copy of his report. According to Brower's recent court testimony, Thompson "indicated that he didn't even have a copy. Even his own personal copy had been picked up. . . . He had been instructed to rewrite the report and eliminate any speculation . . . as to the cause of the effects that he'd seen on the sheep." Thus began what the sheepmen say was the initial stage of the government's suppression.

The AEC clearly needed more data before it could make a public announcement, and by extraordinary luck they were available at the Hanford laboratory. Three years earlier, the lab had begun feeding radioiodine to sheep in an attempt to assess the hazards of plutonium production plants to animals nearby. In the summer of 1953, the AEC asked the scientists directing this work—Leo Bustad, Hans Kornberg, and several others—to compare their findings with the observations in Utah. They concluded, in a report released that November, that "the Utah sheep showed no evidence of radiation damages observed in experimentally treated sheep."

It was a difficult conclusion to reach, given the prevalence of stillborn or stunted and extremely weak lambs in both groups. But the authors somehow overlooked these adverse effects in fetal lambs when writing the report. Instead of indicating that several lambs in one experimental group were stillborn, for example, Bustad and his colleagues said only that "in this group a significant reduction in birth weight occurred." Despite the fact that two-thirds of the sheep that died in Utah were lambs, the report

primarily compared adult sheep. Not many adult sheep died in the Hanford experiments. Although the report failed to say what killed the Utah sheep, AEC officials later suggested that malnutrition and harsh weather were to blame.

Curiously, some of the details on fetal lambs omitted from this report were provided instead in two separate reports from Hanford to the AEC. They were reviewed by various agency officials, including Pearson, who was then chief of the biology branch in the division of biology and medicine, and Bernard Trum, who was then an Army veterinarian affiliated with the AEC laboratory at Oak Ridge. Neither Pearson nor Trum brought the fetal lamb results to the attention of the sheepmen at the height



In a pamphlet issued in 1957, the AEC advised ranchers not to worry if their Geiger counters went "crazy."

of the controversy. Eventually, in 1957, these extra details were published in two articles by Bustad and his colleagues in the *American Journal of Pathology* and in *Radiological Research*. But the trial was then over and the sheepmen failed to notice.

Discovery of the discrepancy in the details of these reports was not made until 1980, when Harold Knapp compared the 1953 and 1957 data in the course of writing a lengthy report on the sheep deaths for a congressional committee. He brought it to the attention of officials at the Energy Department, a key congressional staff member, and the original attorney for the sheep owners, Dan Bushnell. Bushnell, in turn, filed a new motion before Judge Christensen, who ordered a hearing last February, at which former AEC employees reminisced and tried to explain why crucial details were apparently suppressed in 1953.

Trum, who went on to lecture on pathology and direct a primate research laboratory at Harvard University, said in court testimony he thought they were omitted because they were irrelevant. "Your honor, I think it would have been very confusing," he said. "I think it would have confused everybody." Other

scientists, including Knapp, testified that the information was highly relevant, because lambs in Utah received doses similar to those at the Hanford laboratory. Judge Christensen agreed that—at the least—the information "was of substantial significance and weight" in favor of the sheepmen, and that it "was essential to a fair and proper consideration" of their claims for compensation.

Bustad, who is now dean of the College of Veterinary Medicine at Washington State University, also appeared at the hearings. He recalled that information on fetal lambs was omitted from the report primarily because Trum and other AEC officials were already aware of it. In addition, he noted, the more detailed and revealing Hanford reports to the AEC were listed in footnotes to the public report, and might have been caught if the sheepmen had been more on their toes. Christensen said that "the Court finds these explanations insufficient." Critical information was buried in the footnote references, he said, and whether Bustad intentionally buried it there "is beside the point." Neither the court nor the sheepmen should have been required to ferret it out.

Christensen listed suppression of the fetal lamb data as one of two reasons for beginning a new trial. The other was the government's campaign to force Thompson and Veenstra to revise their opinions on the cause of the deaths. Although both had been subjected to pressure before, the efforts were intensified after the sheepmen filed a lawsuit for compensation in February 1955.

Early in the following month, a group of federal attorneys including Donald Fowler, who serves at present as general counsel to the California Institute of Technology, met with AEC officials at the Nevada test site to plot strategy. According to minutes of the meeting, it was decided that Trum would be assigned to look into the problem posed by the two veterinarians. On 25 March, Trum wrote a letter to Veenstra, listing some new AEC research results and "wondering if you might not have changed your mind about these things." Trum, who had the superior position in the Army Veterinary Corps, also said, "I shouldn't like to go into this thing divided within our own Corps if we can avoid it."

Before Veenstra had an opportunity to reply, Trum arrived on his doorstep in San Francisco and spent 3 hours arguing about the deaths. At the time, Veenstra was adamant in his beliefs and critical of the Hanford and Los Alamos experiments because they failed to measure the

accumulated effect of a whole-body exposure similar to that received by the sheep in Utah. A week later, however, he penned a letter to Trum with contrary sentiments. "Enjoyed your visit last Friday very much. In view of all your data and lack of ours, the Laboratory has decided not to make any official statement. . . . I will just report what we found and say we felt it a possibility that should be pointed out for consideration," the letter says.

On the same day, he typed out a long letter, also to Trum, in which he stated that "our position has not been materially changed, basically because we are still of the opinion that radiation could have contributed to the deaths of the animals." Surviving copies are marked as follows: "This letter was not sent—has not been published and is confidential to the Department." According to various testimony, Veenstra handed it to John Finn, a Justice Department trial attorney, when Finn followed up on Trum's visit. Finn gave it to Charles Eason, an AEC attorney, who passed it along to Paul Pearson.

Since the transcript of the original sheep trial disappeared in 1979, shortly after release of previously classified government documents, no one is sure exactly what Veenstra said on the stand. Judge Christensen recollects that his testimony was at best only weakly in favor of the sheepmen. "It seems likely," he stated in his recent opinion, "that the Trum pressure chilled the maintenance of his opinion." The judge also said that Veenstra had exhibited "strange and tortuous behavior" resulting from pressure that amounted to "deceitful conduct beyond acceptable discussions among scientific colleagues preparing to reflect their own views in court." Veenstra is now retired and living in Alamogordo, New Mexico.

Trum also visited Thompsonsett at his veterinary animal hospital in Los Alamos, as did two AEC trial attorneys and its general counsel. Shortly afterward, Trum sent Thompsonsett a "model letter," which Thompsonsett signed with only a few changes. "I was of the opinion that radiation caused the deaths of sheep or at least contributed to them," the letter stated. "Subsequently I've re-evaluated my position as more information became available . . . my opinion, as of now, is in agreement with the statement of AEC." The letter was mailed to an AEC attorney, with copies sent to Pearson and Trum.

Attorneys for the sheep owners were suspicious of Thompsonsett's change of heart before the 1956 trial, and they

asked him in a deposition who he talked to before signing it. "I can't recall exactly whom, with whom I talked. I talked with a good many people," Thompsonsett replied. The letter's value was such that the sheep owners declined to call on him at the trial. Thompsonsett is now deceased.

At the recent hearing before Judge Christensen, Trum said that Thompsonsett had requested his literary assistance. His own involvement stemmed only from a desire "to save those little things that come into making professional people look kind of bad, you know," Trum testified. "You were hoping to save Thompsonsett from embarrassment?" asked the judge. "Embarrassment and—disagreement," Trum replied. In a recent telephone interview from his home in Sherborn, Massachusetts, Trum said that Thompsonsett had also been "under pressure from the scientific group at Los Alamos. I thought I would help him."

In his recent ruling, the judge took a different view of Trum's efforts. He said they had been "unjustified, improper, and incompatible with the judicial process." Trum told *Science* that he feels "it's always proper to try to help somebody to keep the scientific record straight. Now, as to whether that is judicially proper, I don't know."

The AEC clearly benefited from Trum's activities when attorneys for the plaintiffs asked the government in a formal interrogatory whether anyone involved in the investigation had disagreed with the AEC report or concluded that fallout was a possible cause of injury. Taking into account the latest repudiations, federal attorneys answered by saying, "we are not aware of anyone who is involved in the Commission's investigation . . . who now disagrees with the report issued by the AEC" [emphasis added]—a response that neatly led the sheepmen astray.

Finn, who reviewed interrogatory answers after they were drafted by Fowler, Eason, and a third attorney, acknowledged in recent testimony that the response was not as complete as it should have been. Fowler has testified candidly that it was drafted so as to protect the government's interests. He said, however, that he expected it to be caught by opposing counsel, and that there was no intention to defraud the court or withhold information. Christensen was not as solicitous. In various parts of his recent opinion, he said that the answer was unresponsive, intentionally evasive, and untrue. And he reserved other harsh words for the government's attorneys. Several, he said, were aware not only of the pressures on Veenstra and Thomp-



A fallout cloud sweeps through Nevada

This photograph was taken in the 1950's by a rancher, Joseph Fallini, who says he was forced to store the film in a lead-lined box to prevent its exposure by radiation as the cloud swept past his home.

sett but also of the fetal lamb data from Hanford. Consequently, "one or more of the government attorneys knowingly participated in a program for the concealment from the court of facts which he or she or they knew or in good conscience should have known the Court was entitled to have."

Unless it is reversed on appeal, Christensen's opinion could be pivotal in a separate civil suit brought by the sheepmen against Pearson, Dunning, Bustad, Kornberg, Fowler, Finn, Eason, and several others in Utah state court. The charge is "fraud, misrepresentation and intentional misconduct of each defendant individually and as a group," and the award requested is \$42 million. Pearson is now a professor of nutrition and food sciences at the University of Arizona; Kornberg is a consultant to the Electric Power Research Institute; Finn is retired and living in Miami; and Eason is the Washington representative for a Kentucky firm involved in the disposal of low-level radioactive wastes. All defendants in the suit, which is still in preliminary stages, will be represented by Justice Department attorneys.

The most remarkable facet of this controversy is its very existence. None of those who were involved at the time could ever have imagined that the deaths of 4500 sheep would be the topic of fresh lawsuits 30 years later. An important episode in nuclear weapons development might soon be recast in history because of the curiosity and persistence of only a few people.—R. JEFFREY SMITH