Animal Liberation

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"A most important book that will change the way many of us look at animals – and, ultimately, at ourselves."

– *Chicago Tribune*

Chapter 2

Tools for Research . . .

your taxes at work

Project X, a popular film released in 1987, gave many Americans their first glimpse into animal experiments carried out by their own armed forces. The film's plot centers on an air force experiment designed to see whether chimpanzees could continue to "fly" a simulated plane after being exposed to radiation. A young air force cadet assigned to duty in the laboratory becomes attached to one particular chimpanzee, with whom he can communicate in sign language. When this chimpanzee's turn for exposure to radiation comes, the young man (with the assistance of his attractive girlfriend, naturally) determines to liberate the chimpanzees.

The plot was fiction, but the experiments were not. They were based on experiments that have been conducted over many years at Brooks Air Force Base, in Texas, and variations of which are continuing. But filmgoers did not get the whole story. What happened to the chimpanzees in the film was very much a softened version of what really happens. So we should consider the experiments themselves, as described in documents issued by Brooks Air Force Base.

As indicated in the film, the experiments involve a kind of flight simulator. The device is known as a Primate Equilibrium Platform, or PEP. It consists of a platform that can be made to pitch and roll like an airplane. The monkeys sit in a chair that is part of the platform. In front of them is a control stick, by means of which the platform can be returned to a horizontal position. Once monkeys have been trained to do this, they are subjected to radiation and to chemical warfare agents, to see how these affect their ability to fly. (A photograph of the Primate Equilibrium Platform appears following page 157.)

The standard training procedure for the PEP is described in a Brooks Air Force Base publication entitled "Training Procedure for Primate Equilibrium Platform."[1] The following is a summary:

Phase I (chair adaptation): The monkeys are "restrained" (in other words, tied down) in the PEP chair for one hour per day for five days, until they sit quietly.

Phase II (stick adaptation): The monkeys are restrained in the PEP chair. The chair is then tipped forward and the monkeys are given electric shocks. This causes the monkey to "turn in the chair or bite the platform. . . . This behavior is redirected toward the [experimenter's] gloved hand which is placed directly over the control stick." Touching the hand results in the shock being stopped, and the monkey (who has not been fed that day) is given a raisin. This happens to each monkey one hundred times a day for between five and eight days.

Phase III (stick manipulation): This time when the PEP is tipped forward, merely touching the stick is not enough to stop the electric shock. The monkeys continue to receive electric shocks until they pull the stick back. This is repeated one hundred times per day.

Phases IV–VI (push stick forward and pull stick back): In these phases the PEP is tipped back and the monkeys are shocked until they push the stick forward. Then the PEP is again tilted forward, and they must again learn to pull the stick back. This is repeated one hundred times per day. Then the platform switches randomly between backward and forward and the monkeys are again shocked until they make the appropriate response.

Phase VII (control stick operational): Up to this point, although the monkeys have been pulling the control stick backward and forward, it has not affected the position of the platform. Now the monkey controls the position of the platform by pulling the stick. In this phase the automatic shocker does not function. Shocks are manually given at approximately every three or four seconds for a 0.5 second duration. This is a slower rate than previously, to ensure that correct behavior is not punished and therefore, to use the jargon of the manual, "extinguished." If the monkey does stop performing as desired, the training returns to phase VI. Otherwise, training continues in this phase until the monkey can maintain the platform at a nearly horizontal level and avoid 80 percent of the shocks given.

The time taken for training the monkeys in phases III through VII is ten to twelve days.

After this period, training continues for another twenty days. During this further period a randomizing device is used to make the chair pitch and roll more violently, but the monkey must maintain the same level of performance in returning the chair to the horizontal or else receive frequent electric shocks.

All this training, involving thousands of electric shocks, is only preliminary to the real experiment. Once the monkeys are regularly keeping the platform horizontal most of the time, they are exposed to lethal or sublethal doses of radiation or to chemical warfare agents, to see how long they can continue to "fly" the platform. Thus, nauseous and probably vomiting from a fatal dose of radiation, they are forced to try to keep the platform horizontal, and if they fail they receive frequent electric shocks. Here is one example, taken from a United States Air Force School of Aerospace Medicine report published in October 1987—after *Project X* had been released.[2]

The report is entitled "Primate Equilibrium Performance Following Soman Exposure: Effects of Repeated Daily Exposures to Low Soman Doses." Soman is another name for nerve gas, a chemical warfare agent that caused terrible agony to troops in the First World War, but fortunately has been very little used in warfare since then. The report begins by referring to several previous reports in which the same team of investigators studied the effects of "acute exposure to soman" on performance in the Primate Equilibrium Platform. This particular study, however, is on the effect of low doses received over several days. The monkeys in this experiment had been operating the platform "at least weekly" for a minimum of two years and had received various drugs and low doses of soman before, but not within the previous six weeks.

The experimenters calculated the doses of soman that would be sufficient to reduce the monkeys' ability to operate the platform. For the calculation to be made, of course, the monkeys would have been receiving electric shocks because of their inability to keep the platform level. Although the report is mostly concerned with the effect of the nerve poison on the performance level of the monkeys, it does give some insight into other effects of chemical weapons:

> The subject was completely incapacitated on the day following the last exposure, displaying neurological symptoms including gross incoordination, weakness, and intention tremor.... These symptoms persisted for several days, during which the animal remained unable to perform the PEP task.[3]

Dr. Donald Barnes was for several years principal investigator at the U.S. Air Force School of Aerospace Medicine, and in charge of the experiments with the Primate Equilibrium Platform at Brooks Air Force Base. Barnes estimates that he irradiated about one thousand trained monkeys during his years in this position. Subsequently he has written:

> For some years, I had entertained suspicions about the utility of the data we were gathering. I made a few token attempts to ascertain both the destination and the purpose of the technical reports we published but now acknowledge my eagerness to accept assurances from those in command that we were, in fact, providing a real service to the U.S. Air Force and, hence, to the defense of the free world. I used those assurances as blinkers to avoid the reality of what I saw in the field, and even though I did not always wear them comfortably, they did serve to protect me from the insecurities associated with the potential loss of status and income....
>
> And then, one day, the blinkers slipped off, and I found myself in a very serious confrontation with Dr. Roy DeHart, Commander, U.S. Air Force School of Aerospace Medicine. I tried to point out that, given a nuclear confrontation, it is highly unlikely that operational commanders will go to charts and figures based upon data from the rhesus monkey to gain estimates of probable force strength or second strike capability. Dr. DeHart insisted that the data will be invaluable, asserting, "They don't know the data are based on animal studies."[4]

Barnes resigned and has become a strong opponent of animal experimentation; but experiments using the Primate Equilibrium Platform have continued.

Project X lifted the veil on one kind of experiment conducted by the military. We have now examined that in a little detail, al-

though it would take a long time to describe all the forms of radiation and chemical warfare agents tested, in varying doses, on monkeys in the Primate Equilibrium Platform. What we now need to grasp is that this is just one very small part of the total amount of military experimentation on animals. Concern about this experimentation goes back several years.

In July 1973 Representative Les Aspin of Wisconsin learned through an advertisement in an obscure newspaper that the United States Air Force was planning to purchase two hundred beagle puppies, with vocal cords tied to prevent normal barking, for tests of poisonous gases. Shortly afterward it became known that the army was also proposing to use beagles—four hundred this time—in similar tests.

Aspin began a vigorous protest, supported by antivivisection societies. Advertisements were placed in major newspapers across the country. Letters from an outraged public began pouring in. An aide from the House of Representatives Armed Services Committee said that the committee had received more mail on the beagles than it had received on any other subject since Truman sacked General MacArthur, while an internal Department of Defense memo released by Aspin said that the volume of mail the department had received was the greatest ever for any single event, surpassing even the mail on the bombings of North Vietnam and Cambodia.[5] After defending the experiments initially, the Defense Department then announced that it was postponing them and looking into the possibility of replacing the beagles with other experimental animals.

All this amounted to a curious incident—curious because the public furor over this particular experiment implied a remarkable ignorance of the nature of standard experiments performed by the armed services, research establishments, universities, and commercial firms of many different kinds. True, the proposed air force and army experiments were designed so that many animals would suffer and die without any certainty that this suffering and death would save a single human life or benefit humans in any way at all; but the same can be said of millions of other experiments performed each year in the United States alone. Perhaps the concern arose because the experiments were to be done on beagles. But if so, why has there been no protest at the following experiment, conducted more recently:

Under the direction of the U.S. Army Medical Bioengineering Research and Development Laboratory at Fort Detrick, in Frederick, Maryland, researchers fed 60 beagle dogs varied doses of the explosive TNT. The dogs were given the TNT in capsules every day for six months. Symptoms observed included dehydration, emaciation, anemia, jaundice, low body temperature, discolored urine and feces, diarrhea, loss of appetite and weight loss, enlarged livers, kidneys and spleen, and the beagles became uncoordinated. One female was "found to be moribund [dying]" during week 14 and was killed; another was found dead during week 16. The report states that the experiment represents "a portion" of the data which the Fort Detrick laboratory is developing on the effects of TNT on mammals. Because injuries were observed even at the lowest doses, the study failed to establish the level at which TNT had no observable effects; thus, the report concludes "additional studies...of TNT in beagle dogs may be warranted."[6]

In any case, it is wrong to limit our concern to dogs. People tend to care about dogs because they generally have more experience with dogs as companions; but other animals are as capable of suffering as dogs are. Few people feel sympathy for rats. Yet rats are intelligent animals, and there can be no doubt that rats are capable of suffering and do suffer from the countless painful experiments performed on them. If the army were to stop experimenting on dogs and switch to rats instead, we should not be any less concerned.

Some of the worst military experiments are carried out at a place known as AFRRI—the Armed Forces Radiobiology Research Institute, in Bethesda, Maryland. Here, instead of using a Primate Equilibrium Platform, experimenters have tied animals down in chairs and irradiated them or have trained them to press levers and observed the effects of irradiation on their performance. They have also trained monkeys to run in an "activity wheel," which is a kind of cylindrical treadmill. (See photograph following page 157.) The monkeys receive electric shocks unless they keep the wheel moving at speeds above one mile per hour.

In one experiment using the primate activity wheel, Carol Franz of the behavioral sciences department at AFRRI trained thirty-nine monkeys for nine weeks, two hours per day, until

they could alternate "work" and "rest" periods for six continuous hours. They were then subjected to varying doses of radiation. Monkeys receiving the higher doses vomited up to seven times. They were then put back into the activity wheel to measure the effect of the radiation on their ability to "work." During this period, if a monkey did not move the wheel for one minute, "shock intensity was increased to 10 mA." (This is an extremely intense electric shock, even by the quite excessive standards of American animal experimentation; it must cause very severe pain.) Some monkeys continued to vomit while in the activity wheel. Franz reports the effect that the various doses of radiation had on performance. The report also indicates that the irradiated monkeys took between a day and a half and five days to die.[7]

Since I do not wish to spend this entire chapter describing experiments conducted by the United States armed forces, I shall turn now to nonmilitary experimentation (although we shall, in passing, examine one or two other military experiments where they are relevant to other topics). Meanwhile, I hope that United States taxpayers, whatever they think the size of the military budget should be, will ask themselves: Is this what I want the armed forces to be doing with my taxes?

We should not, of course, judge all animal experimentation by the experiments I have just described. The armed services, one might think, are hardened to suffering by their concentration on war, death, and injury. Genuine scientific research, surely, will be very different, won't it? We shall see. To begin our examination of nonmilitary scientific research, I shall allow Professor Harry F. Harlow to speak for himself. Professor Harlow, who worked at the Primate Research Center in Madison, Wisconsin, was for many years editor of a leading psychology journal, and until his death a few years ago was held in high esteem by his colleagues in psychological research. His work has been cited approvingly in many basic textbooks of psychology, read by millions of students taking introductory psychology courses over the last twenty years. The line of research he began has been continued after his death by his associates and former students.

In a 1965 paper, Harlow describes his work as follows:

> For the past ten years we have studied the effects of partial social isolation by raising monkeys from birth onwards in

> bare wire cages.... These monkeys suffer total maternal deprivation.... More recently we have initiated a series of studies on the effects of total social isolation by rearing monkeys from a few hours after birth until 3, 6, or 12 months of age in [a] stainless steel chamber. During the prescribed sentence in this apparatus the monkey has no contact with any animal, human or sub-human.

These studies, Harlow continues, found that

> sufficiently severe and enduring early isolation reduces these animals to a social-emotional level in which the primary social responsiveness is fear.[8]

In another article Harlow and his former student and associate Stephen Suomi described how they were trying to induce psychopathology in infant monkeys by a technique that appeared not to be working. They were then visited by John Bowlby, a British psychiatrist. According to Harlow's account, Bowlby listened to the story of their troubles and then toured the Wisconsin laboratory. After he had seen the monkeys individually housed in bare wire cages he asked, "Why are you trying to produce psychopathology in monkeys? You already have more psychopathological monkeys in the laboratory than have ever been seen on the face of the earth."[9]

Bowlby, incidentally, was a leading researcher on the consequences of maternal deprivation, but his research was conducted with children, primarily war orphans, refugees, and institutionalized children. As far back as 1951, before Harlow even began his research on nonhuman primates, Bowlby concluded:

> The evidence has been reviewed. It is submitted that evidence is now such that it leaves no room for doubt regarding the general proposition that the prolonged deprivation of the young child of maternal care may have grave and far-reaching effects on his character and so on the whole of his future life.[10]

This did not deter Harlow and his colleagues from devising and carrying out their monkey experiments.

In the same article in which they tell of Bowlby's visit, Harlow and Suomi describe how they had the "fascinating idea" of inducing depression by "allowing baby monkeys to attach to cloth surrogate mothers who could become monsters":

> The first of these monsters was a cloth monkey mother who, upon schedule or demand, would eject high-pressure compressed air. It would blow the animal's skin practically off its body. What did the baby monkey do? It simply clung tighter and tighter to the mother, because a frightened infant clings to its mother at all costs. We did not achieve any psychopathology.
>
> However, we did not give up. We built another surrogate monster mother that would rock so violently that the baby's head and teeth would rattle. All the baby did was cling tighter and tighter to the surrogate. The third monster we built had an embedded wire frame within its body which would spring forward and eject the infant from its ventral surface. The infant would subsequently pick itself off the floor, wait for the frame to return into the cloth body, and then cling again to the surrogate. Finally, we built our porcupine mother. On command, this mother would eject sharp brass spikes over all of the ventral surface of its body. Although the infants were distressed by these pointed rebuffs, they simply waited until the spikes receded and then returned and clung to the mother.

These results, the experimenters remark, were not so surprising, since the only recourse of an injured child is to cling to its mother.

Eventually, Harlow and Suomi gave up on the artificial monster mothers because they found something better: a real monkey mother who was a monster. To produce such mothers, they reared female monkeys in isolation, and then tried to make them pregnant. Unfortunately the females did not have normal sexual relations with male monkeys, so they had to be made pregnant by a technique that Harlow and Suomi refer to as a "rape rack." When the babies were born the experimenters observed the monkeys. They found that some simply ignored the infants, failing to cuddle the crying baby to the breast as normal monkeys do when

they hear their baby cry. The other pattern of behavior observed was different:

> The other monkeys were brutal or lethal. One of their favorite tricks was to crush the infant's skull with their teeth. But the really sickening behavior pattern was that of smashing the infant's face to the floor, and then rubbing it back and forth.[11]

In a 1972 paper, Harlow and Suomi say that because depression in humans has been characterized as embodying a state of "helplessness and hopelessness, sunken in a well of despair," they designed a device "on an intuitive basis" to reproduce such a "well of despair" both physically and psychologically. They built a vertical chamber with stainless steel sides sloping inward to form a rounded bottom and placed a young monkey in it for periods of up to forty-five days. They found that after a few days of this confinement the monkeys "spend most of their time huddled in a corner of the chamber." The confinement produced "severe and persistent psychopathological behavior of a depressive nature." Even nine months after release the monkeys would sit clasping their arms around their bodies instead of moving around and exploring their surroundings as normal monkeys do. But the report ends inconclusively and ominously:

> Whether [the results] can be traced specifically to variables such as chamber shape, chamber size, duration of confinement, age at time of confinement or, more likely, to a combination of these and other variables remains the subject of further research.[12]

Another paper explains how, in addition to the "well of despair," Harlow and his colleagues created a "tunnel of terror" to produce terrified monkeys,[13] and in yet another report Harlow describes how he was able "to induce psychological death in rhesus monkeys" by providing them with terry cloth–covered "mother surrogates" that were normally kept at a temperature of 99 degrees Fahrenheit, but could be rapidly chilled to 35 degrees Fahrenheit to simulate a kind of maternal rejection.[14]

Harlow is now dead, but his students and admirers have spread across the United States and continue to perform experi-

A rhesus monkey confined to a treadmill at the Armed Forces Radiobiology Research Institute, Bethesda, Maryland, which conducts military research on lethal doses of gamma-neutron radiation. The primates are trained through electric shock to turn a wheel at a speed between one and five miles per hour. Following an eight-week conditioning period, the monkeys are irradiated and again tested in the wheel until death. The research compares the individual monkey's performance pattern before and after exposure to lethal radiation. See pp. 29–31. (Photo by Henry Spira.)

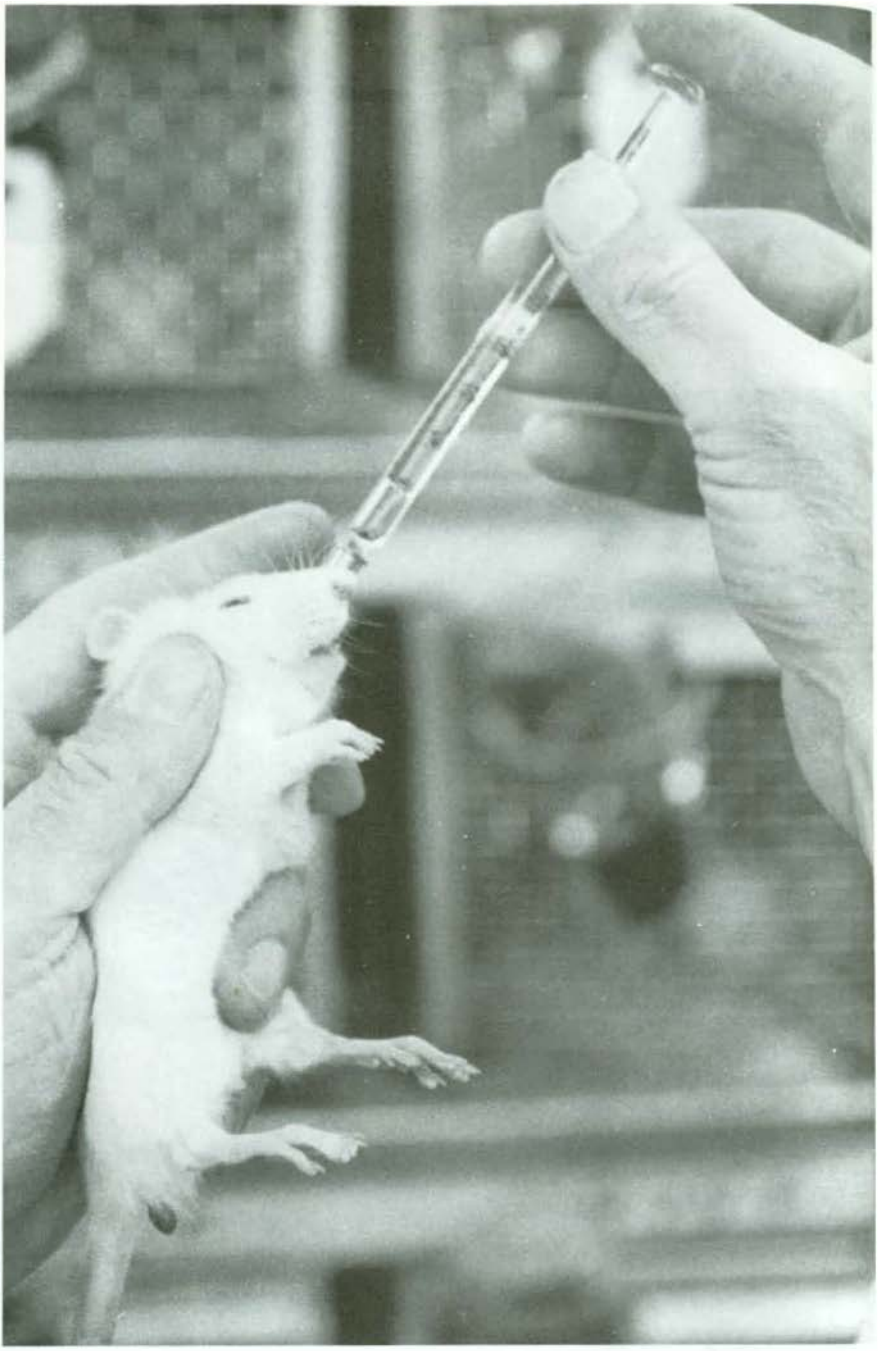
At Brooks Air Force Base in Texas, monkeys are trained through electric shocks to keep these platforms level by means of controls that simulate the flying of Air Force bombers. They are then gassed or irradiated to test how long they can continue to keep the platforms level under simulated conditions of chemical or nuclear attack. See pp. 25–28.

To test a detergent for possible eye irritation, a paste of the detergent is applied directly to the eyes of rabbits, which are then bandaged and left to react to the paste. The immobilized rabbits are stacked on shelves (visible in the background) for several hours. Since rabbits cannot cry and flush the detergent from the eye, their capacity for irritation is much greater than that of humans. (UPI/Bettmann Archives Photo.)






The above photographs show the effects of irritants placed in the eyes of rabbits as part of the Draize Test. They are taken from the U.S. Consumer Product Safety Commission's *Illustrated Guide for Grading Eye Irritation Caused by Hazardous Substances*. According to the introduction to this publication, its stated purpose is "to assist in training laboratory personnel ... and thereby contribute to more uniform interpretations of the results obtained when a substance is tested in accordance with the official method." In other words, laboratory staff are expected to place potentially irritating substances in the eyes of rabbits, wait for periods ranging from a few hours to seven days, and then judge the irritancy of these substances by comparing the appearance of the rabbits' eyes with these photographs.



This mouse is one of a group undergoing an LD50 test. The mice will be force-fed the substance to be tested (perhaps a food coloring or synthetic flavoring agent) until 50 percent of the group are poisoned to death. See pp. 53–56.

During their pregnancies, sows are confined in stalls that do not permit them to turn around or walk to and fro. (Photo by Jim Mason and J.A. Keller, from the book *Animal Factories.*)

Closeup of battery cage at Somerset Poultry Farm, Victoria, Australia. There were seven hens in this cage, which measured about 18 inches by 18 inches. (Photo by Patty Mark.)

A production line carries live chickens on their way to slaughter in the killing room of a processing plant. (Photo by Jim Mason and J.A. Keller, from the book *Animal Factories.*)

After their confinement during pregnancy, sows are often immobilized from the time they give birth until the piglets are weaned. (Photo by Jim Mason and J.A. Keller, from the book *Animal Factories*.)

This veal calf will spend its whole life constrained to this pen so that its anemic muscles will remain tender when butchered. In order to lie down, such calves must hunch up to fit their legs into the 22-inch stall. (Photo courtesy of Humane Farming Association.)

Philosophy/Ethics

THE BOOK THAT STARTED A REVOLUTION

Since its original publication in 1975, this groundbreaking work by Peter Singer has awakened millions of concerned men and women to the shocking abuse of animals everywhere—inspiring a worldwide movement aimed at transforming the way we treat animals. *Animal Liberation* exposed the chilling realities of "factory farms" while offering alternatives that are good not only for animals, but also for humans and for the environment. This edition, updated with a new preface by the author, assesses the impact of the Animal Liberation movement over the recent decades and highlights the ways in which animals continue to be used as mere tools for human use, without concern for their interests. An important and persuasive appeal to basic ethical principles, *Animal Liberation* is essential reading for the supporter and the skeptic alike.

"Singer's documentation is unrhetorical and unemotional, his arguments tight and formidable, for he bases his case on neither personal nor religious highly abstract philosophical principles, but on moral positions most of us already accept."

—*New York Times Book Review*

"A most important and responsible work. Everyone ought to read it, and ponder deeply whether we do not need to change our view of the world and our responsibility toward its creatures."

—Richard Adams, author of *Watership Down*

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