

Counting Sheep in Skull Valley, Utah

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March 14th, 1968: Skull Valley, Utah



**Shock and
Disbelief:
between 6,000
& 7,000 sheep
dead**



Background:

Dugway Proving
Ground

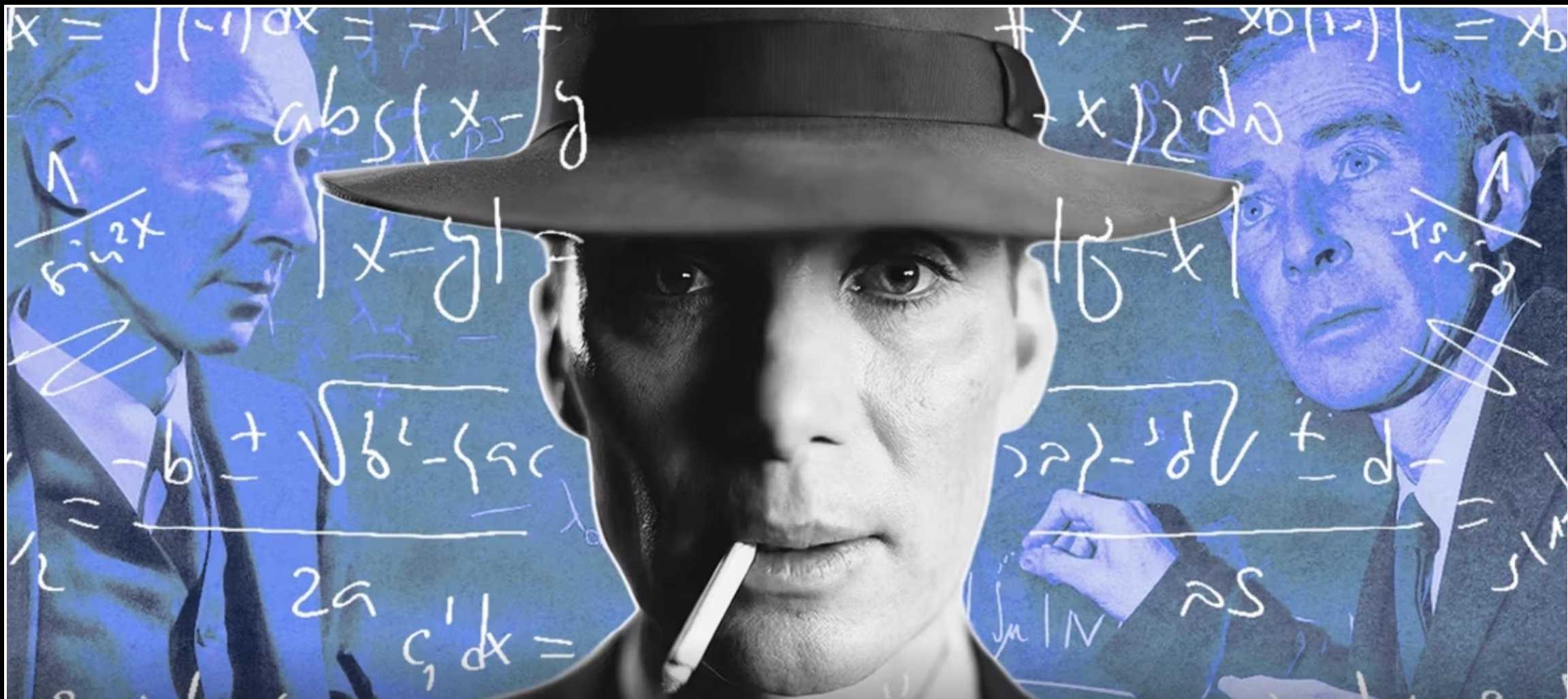


Background: Dugway Proving Ground





Dugway Proving Ground



"Now I am become Death, the destroyer of worlds."



“Little Boy”

Radioactive Cloud
Above Hiroshima



Atomic Bomb Encasing

Cold War

- Chemical and biological weapons were another side of the arms race
- U.S.A. estimated to have spent ~2 billion USD on development and stockpiling of chemical and biological weapons between 1961-1969
- Dugway and Skull Valley VX incident is the most famous Cold War domestic testing occurrence





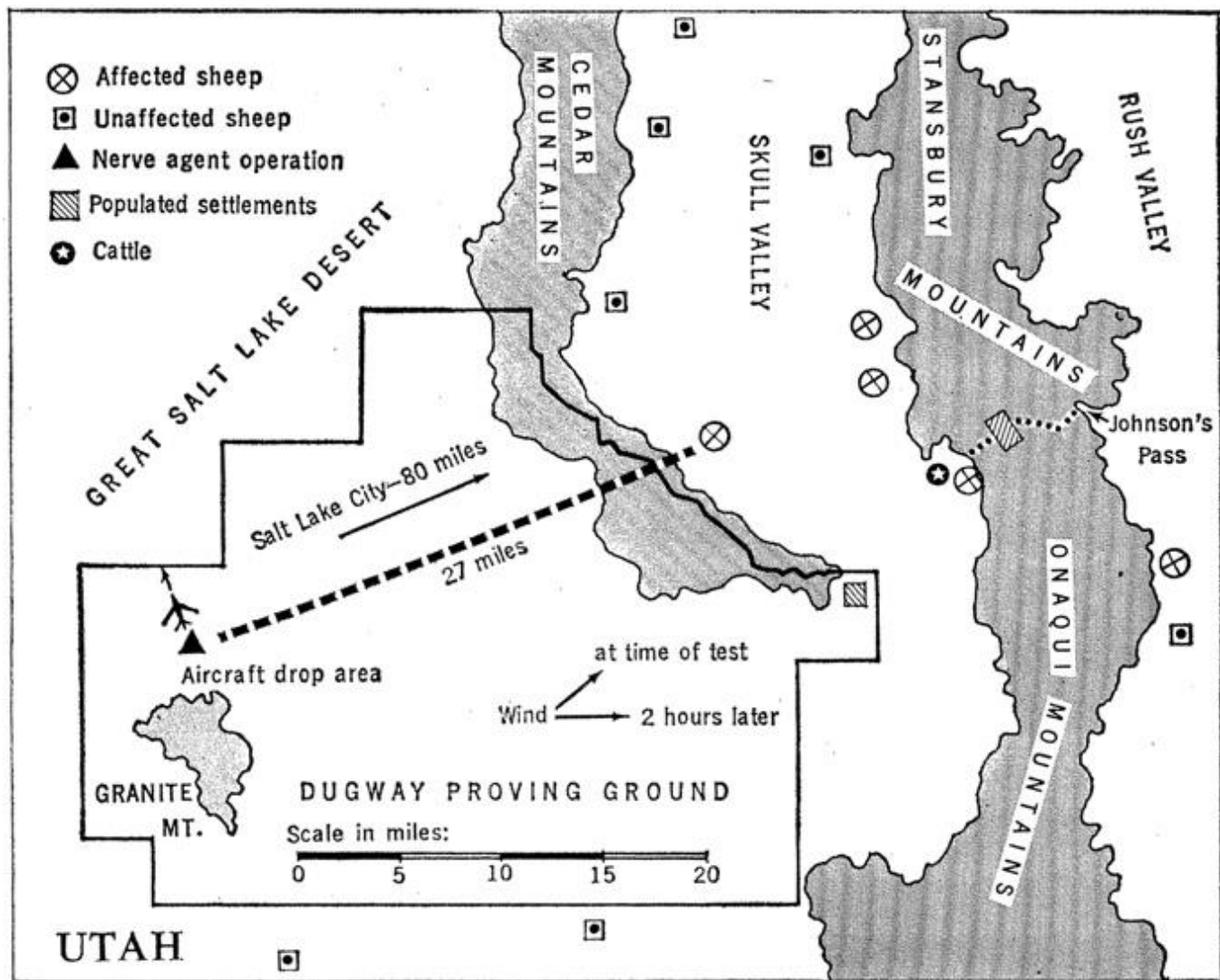
Back to Skull Valley:

Initially, Army officials denied any possible involvement

- March 21st, 1968
 - Office of Senator Frank E. Moss (D-Utah) revealed that Dugway had conducted three separate nerve agent operations (using VX) on March 13th (one day before) from a Pentagon document
 - Information was released to media

VX

- Organophosphate / Nerve Agent
- Oily liquid
- Low volatility; Aging Half Life 48 hours
- High environmental persistence especially in cold temperature



What Happened on March 14th, 1968 in Skull Valley?

- Open Air Spray test of VX, a nerve agent
- F-4 Fighter jet released 320 gallons of liquid VX with two TMU-28/B spray tanks

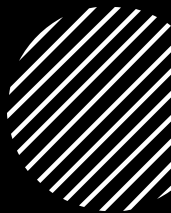


What Happened on March 14th, 1968 in Skull Valley?

- Change in weather conditions
- Agent VX was carried downwind toward the sheep and their vegetation
- VX persisted for at least 3 weeks in the area



Testing for Nerve Agent Poisoning



Federal, Army, State and independent civilian scientists and veterinarians took part in investigation



VX was confirmed in the sheep, vegetation and in snow



Agent identified in sheep was identical to test agent supplied by Dugway



Testing for Nerve Agent Poisoning

- Cholinesterase levels obtained → decreased
- Likely ingestion by eating contaminated vegetation, snow, percutaneous exposure
- Difficulty in determining exact amount of exposure
- Forage from area was taken to healthy sheep elsewhere → also got sick + decreased cholinesterase
- Experiments at Dugway feeding sheep VX → developed similar symptoms



Some Puzzle Pieces Missing...

- Human casualties?
- Army conducted RBC cholinesterase testing on nearby residents
- No other animals clearly effected
 - Some horses and cattle with lowered RBC cholinesterase levels



Some Puzzle Pieces Missing...

- Sheep were likely or more susceptible compared to other animals???
 - Other theories?
 - Confounded by Pesticide ingestion?
-



U.S. Army Remained Skeptical

- US Army: Stated 'highly suspicious,' but remained skeptical that VX alone was causal
- Data inconclusive
- Provided monetary compensation to sheep ranchers



What eventually
resulted from all this?

[461] Nov. 25 *Public Papers of the Presidents*

461 Statement on Chemical and Biological Defense Policies
and Programs. *November 25, 1969*

SOON AFTER taking office I directed a comprehensive study of our chemical and biological defense policies and programs. There had been no such review in over 15 years. As a result, objectives and policies in this field were unclear and programs lacked definition and direction.

Under the auspices of the National Security Council, the Departments of State and Defense, the Arms Control and Disarmament Agency, the Office of Science and Technology, the scientific community, and other agencies worked closely together on this study for over 6 months. These Government efforts were aided by contributions from the scientific community through the National Science Advisory Committee.

This study has now been completed and its findings carefully considered by the National Security Council. I am now reporting the decisions taken on the basis of this review.

CHEMICAL WARFARE PROGRAM

As to our chemical warfare program, the United States:

—Reaffirms its oft-repeated renuncia-

“asphyxiating, poisonous or other Gases and of Bacteriological Methods of Warfare.” The United States has long reported the principles and objectives of this Protocol. We take this step toward formal ratification to reinforce our continuing advocacy of international restraints on the use of these

BIOLOGICAL RESEARCH PROGRAM

Biological weapons have many unpredictable and potentially unacceptable consequences. They may produce epidemics and impair the health of generations. I have the following to report:

- The United States shall not use of lethal biological weapons, and all other biological warfare.
- The United States will continue biological research to defensive measures such as immunization and other measures.
- The Department of Defense has been asked to make recommendations to the disposal of existing stocks of bacteriological weapons.

- Outrage in congress
- President Richard Nixon, 1969
- Banned open air testing of chemicals and biologicals

Chemical Weapons Convention

First documented use 10,000 B.C.

World War I: phosgene, chlorine, sulfur mustard

World War II: CO & HCN; Germans discovered and stockpiled nerve agents

Hague and Geneva conventions

Iran-Iraq War

1993: Chemical Weapons Convention

1997: Operation for Prohibition of Chemical Weapons

2000's: Syrian Conflict, Assassination of Kim Jong nam, Alexei Navalny, Salisbury Novichok Incident

Back to Skull Valley, Utah

- FOIA requests by news media over the years
- Report from 1970 compiled by researchers at the U.S. Army's Edgewood Arsenal in Maryland
 - Remained classified until 1978
 - Released to public in 1998 by reporter Jim Poole in The Salt Lake Tribune
 - “Difficulty in calculating exactly how much VX the sheep were exposed to...but evidence that the nerve agent was the cause of sheep kill is incontrovertible”
 - ” ...quantity of VX was sufficient to account for the death of the sheep”

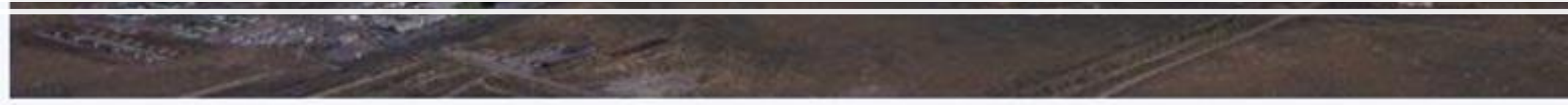
Back to Skull Valley, Utah

- At least 1,987 open air chemical arms tests at Dugway
- ~500,000lb of nerve agents spread to the wind





Dugway Proving Ground Today: World class scientists



GEORGE C. SCOTT

ON A RAMPAGE
FOR GOOD REASON.

RAGE



Produced by ...
Directed by ...
Starring ...
Music by ...
Casting by ...
Costume Designer ...
Production Designer ...
Executive Producers ...
Producers ...
Screenplay by ...
Story by ...
Based on the novel by ...
Distributed by ...



THE STAND

a novel by the author of
THE SHINING

STEPHEN KING



Thank you for listening!

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