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Information gathered to assist in investigation of Cash-Landrum
Radiation Case

I. Exposure to light energy (ultraviolet to infrared)

Effects seem confined to the skin (i.e. would not account for diarrhea, etc.)

Could cause the reported erythema, irritated eyes. I cannot find evidence for hair loss, fingernail damage.

The following is from Dermatology in General Medicine,
T. B. Fitzpatrick, B.A., M.D., Ph.D. (editor), McGraw Hill,
New York, 1971:

P. 990 Initial faint erythema (redness) during exposure. Disappears shortly after. Latent phase. Then a prolonged phase of erythema beginning 2-4 hrs. post-exposure, maximum in 14-20 hrs., persisting add'l 24-48 hrs.

Occurs only on body parts exposed directly.

P. 994 After interval of 48-72 hrs., hyperpigmentation begins (tanning)

Comments:

Light energy could possibly account for the reported eye symptoms, erythema (sunburn).

II. Exposure to ionizing radiation (X-Rays, gamma rays)

Can cause erythema, hair loss, anorexia (loss of appetite), nausea, vomiting, cramps, diarrhea, sores---these were reported by the 3 witnesses. However, the time frames reported do not all correspond with the known effects of radiation, and some of the above effects indicate lethal exposure levels.

The following is from Derm. in Gen Med. (cited above):

P. 1937: A. Erythema -

1. Requires at least 450 rads exposure
2. "Early erythema"
 - a. Begins "early" (?when)
 - b. Disappears about 3rd day "after treatment"
3. "Main (2nd wave) erythema"
 - a. Begins 8th-10th day
 - b. Color deepens over next week
 - c. Begins to abate about day 14-16
 - d. Increased pigmentation appears around day 20

- P. 1037 4. "Late (3rd wave) Erythema"
a. Sometimes occurs
b. Begins about 34-40th day
c. May last 2-3 wks.

- P. 1038 B. Effects on hair
- * 1. About 300 rads necessary for temporary epilation (hair loss)
 - 2. Falls out spontaneously in about 2 wks (? begins to fall out at this time)
 - 3. Goes into resting stage of growth (i.e. no regrowth for a while)
 - * 4. Regrows in 2-3 mos (? begins to regrow at this time?)
 - a. New hair texture is usually normal
 - b. New hair is gray or white (?always?)
 - 5. 1200 rads or more causes permanent epilation

- P. 1038 C. Pigmentation
- 1. About 800 rads causes progressive darkening which begins to appear after about 3 wks.
 - 2. Lasts months to years

- P. 1038 D. Acute radiation dermatitis
- * 1. Follows single exposure greater than 1000 rads
 - 2. Blisters beginning after an accelerated erythema phase
 - 3. Heal after weeks to months
 - 4. Sometimes an ulcer occurs at site after 6-8 wks.

The following information on ionizing radiation is from Radiobiology For the Radiologist, Eric J. Hall, Harper & Row, 1973:

- P. 209 LD50 for man is 300 rads (50% of people exposed to 300 rads will die) (assuming total body exposure rather than therapeutic exposure to a tiny part of body). LD stands for lethal dose. P. 202 - No one has ever survived 1000 rads.

From Chap. 11--"Acute Effects of Whole Body Irradiation":

- P. 200 I. Prodromal syndrome
- A. Early symptoms for limited pd of time, preceeding the syndromes described later
 - B. Dose related
 - C. Difficult to predict precise dose-response due to many variables
 - D. Severe prodrome generally means poor prognosis
~~XXXXXXXXXXXXXXXXXXXXXXXXXXXX~~
 - E. Signs and symptoms
 - 1. Gastrointestinal
 - a. anorexia
 - b. nausea
 - c. vomiting

- d. diarrhea
- e. cramps
- f. salivation
- g. fluid loss/dehydration/wt.loss

2. Neuromuscular

- a. easy fatigue
- b. apathy or listlessness
- c. sweating
- d. fever
- e. headache
- f. hypertension (elevated blood pressure)

F. LD50 dose predominately causes anorexia, nausea, vomit, easy fatigue.

G. Immediate diarrhea, fever, hypertension frequently means supralethal dose

H. Supralethal dose will cause all of the above

II. CNS (Central Nervous System) Syndrome

A. Caused by very high dose (10-15,000 rads)

B. Death in matter of hours

(C. Details in photocopied pages)

P. 202IIII Gastrointestinal (G.I.) Syndrome

A. Follows about 1000 rads

B. Inevitably fatal, usually in 3-10 days

C. Signs and symptoms

1. Nausea

2. Vomiting

3. Prolonged diarrhea---if lasts more than several days, indicates fatal exposure of 1000 rads

4. Dehydration/exhaustion/wt. loss

5. Die from destruction of cells lining G.I. tract

P. 203 IV. Hematopoietic (Blood, bone marrow) Syndrome

A. Follows several hundred rads---i.e. enough to cause prodrome, but not enough to die more quickly due to the G.I. or CNS syndromes, so enough time for the blood system to malfunction and cause death.

B. Most die in about 30 days, some survive to 60 days.

C. Caused by exposure in LD50 range.

D. Signs and symptoms

1. Prodromal (esp. nausea/vomit)

2. Then latent period

3. After about 3 wks, onset of

a. chills

b. fatigue

c. hemorrhages

d. ulcerations in mouth

e. infections and fever

* f. epilation

4. Death unless marrow recovers in time

Summary:

1. Light (UV, etc.) can cause erythema, eye irritation, as reported by the UFO witnesses. No need to invoke UFO to account for UV exposure.

2. Ionizing radiation can cause many of the reported symptoms. However, there are incongruities with this explanation:

a. Betty:

Her survival indicates exposure less than about 400 rads
300 rads can cause hair loss, but not in 5 days--- takes
2-3 wks to begin---and texture should be normal (of regrowth)
~~prolonged hair loss~~ but color should be gray/white
If her diarrhea lasted more than a few days (article
unclear), indicated lethal exposure of 1000 rads
If she was hospitalized and treated for "burn" injuries,
one need not invoke a UFO to explain this

b. Vickie:

Burning of face for several weeks, responding to "baby oil",
might possibly be UV, though doubtful

"Stomach pains and diarrhea" for several weeks would
indicate lethal radiation exposure, unless the
diarrhea was not related to radiation exposure, but
emotionally induced, etc.

"Stomach pains" is not a listed symptom of radiation
exposure, although cramps is.

"Sores persist after 8 months" would indicate at least
1000 rads exposure (to invoke radiation ~~dermatitis~~)---
a lethal exposure unless it was confined to the area
of the sore

3. Quoting from The MUFON UFO Journal Nov. 1981 p. 5:

"Exposure to ultraviolet radiation can produce photophobia,
photophthalmia (arc eye), edema of the eyelids, and erythema of the
skin. Exposure to gamma and x-radiation can provide a strong general
weakness, anorexia, nausea, vomiting, apathy, severe headache, sleep-
lessness, and dizziness. The symptoms provide a clue to the type of
radiation exposure. The degree of illness depends upon the type and
energy of the radiation, the dose, amount of exposure, and a number
of other variables..."(emphasis added).

The above is essentially correct, but, as noted previously, if
one invokes ionizing radiation as the explanation for, for example,
persistent diarrhea, hair loss, and non-healing sores, one cannot
correlate the reported symptoms with exposure to sub-lethal amounts
of radiation.

Without more detailed medical records to work with, I cannot
do much more with this case. Because of the noted incongruities, I
am very skeptical of ionizing radiation as the cause of the witnesses'
unusual symptoms. They may have been exposed to a light/heat source,
but one need not invoke a UFO as the source (a sunlamp would do).