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Comments on Nuclear Science Content of "Z for Zachariah" by R.C. O'Brien (Adopted 21/5/03)

"Z for Zachariah" was written by Robert C. Conly (1918-1973) under the pseudonym of O'Brien. It was published posthumously in 1975. Conly was a writer for the National Geographic Magazine and used the pseudonym to disguise his outside publishings. The novel portrays the life of a US teenage girl resident in current times in a valley that has been left untouched by a recent war involving nuclear, biological and chemical weapons (ref 1984 UK ed. pp27,92).

This novel has long been used as prescribed reading material in Australian secondary schools, but it contains some technical inaccuracies that perpetuate misunderstandings of various aspects of nuclear technology. These inaccuracies are discussed below.

[Note: A few words on alpha, beta and gamma radiations (see also a physics text). Alphas are dangerous only if generated internally. Betas have more range but can be easily shielded against. Gammas are like high energy X-rays and are hard to shield against.]

The "Deadness": Pertains to the area outside the valley where all flora and fauna are dead. The bombs hit no closer than 100 mi (p10), thus it is not clear just what would have killed all living matter in the "deadness", but it would be unlikely to be the radioactive fallout because most plants can withstand very high doses of radiation more than that existing at 100 mi distance. Mr Loomis himself says most people were killed by nerve gas (p47).

Radiation Doses: In the text Geiger counters are used to measure radiation dose (p20). Although the term "Geiger counter" is readily recognised by the public, the type of instrument that is used to measure radiation dose in a field of beta and gamma radiations is a dosimeter. Mr Loomis being knowledgeable in the field, would certainly have known this (p42). His bout with radiation sickness, on the other hand, seems reasonably realistic.

Induced Radioactivity: The induced radiation field inside of a car (p52) irradiated by neutrons from an H-bomb blast 100 mi away would be negligible. The car could be contaminated by fallout, but this could be removed by mechanical means. Also, the radiation level of the library books from Ogdentown (p104) would decay at the same rate whether the books were brought to the valley or not - given that the books were not continually recontaminated by fallout.

Radiation Proof Plastic: There is no such thing as a radiation proof suit plastic or otherwise (p18). This is a fallacy that is perpetuated in science fiction. Air-tight suits can be used to prevent the body from being contaminated by radioactive dust, and chemical and/or biological warfare agents, but they are useless in protecting against external beta and gamma radiations. It is true that the earth's magnetic field protects the earth from cosmic rays (mainly beta particles) (p50), but a suit made to have a strong enough magnetic field to deflect such particles would be impractical. Also, there would be little incentive to develop one since much of fallout radiation also includes gamma radiation which is very penetrating and would be unaffected by any magnetic field.