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In the 1980's a friend of mine, [Bruce Beach](#), wrote **You Will Survive Doomsday**. This document was written with surviving nuclear war in mind, but much of it applies to any general infrastructure breakdown.

You Will Survive Doomsday

By Bruce Beach

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Our purpose in publishing this document is to ameliorate the effects of a nuclear holocaust for as many people as we can reach, and to locate as many people as we can who are willing and able to join our nuclear survival group.

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MYTHS

Here are twenty-three myths that are repeatedly heard (some much more often than others) that this document tries to dispel.

- [MYTH #01](#): Almost everyone will suddenly be killed on doomsday.
- [MYTH #02](#): Most people would be quickly killed by the bomb blasts, thermal radiation, or radioactivity.
- [MYTH #03](#): You can build an adequate shelter in your basement.
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- [MYTH #06](#): There would be no dangerous radioactivity after a couple of weeks.
- [MYTH #07](#): Radiation sickness is not contagious so there is no danger in assisting those affected.
- [MYTH #08](#): Food exposed to radiation becomes radioactive and is therefore not edible.
- [MYTH #09](#): If you have a special *radiation suit* (like you see in the movies and on TV) you will be protected from the radiation.
- [MYTH #10](#): New crops of food grown in future years will not be radioactive.

- **MYTH #11:** There is no such thing as a fallout pill.
- **MYTH #12:** There is a fallout pill that will protect you from all radioactivity.
- **MYTH #13:** There would be dangerous radioactivity for thousands of years.
- **MYTH #14:** There would be no dangerous radioactivity after a couple of years.
- **MYTH #15:** You are prepared if you have a two weeks emergency supply of food stored.
- **MYTH #16:** You should be prepared to be self-sufficient and be able to survive on your own.
- **MYTH #17:** Any survivors would have to live the rest of their lives underground.
- **MYTH #18:** Life after doomsday won't be worth living.
- **MYTH #19:** You need not make any preparation because you are either going to die in the holocaust or be *saved* (religious connotation).
- **MYTH #20:** The bombs today are so large and there are so many they will destroy the world.
- **MYTH #21:** You will receive adequate warning from your government.
- **MYTH #22:** You will receive no warning, and there is no hope if you do.
- **MYTH #23:** One of the primary targets will be nuclear power plants.

This document is published by a nuclear survival group. The group is not affiliated with any religious group or other organization. We welcome inquiries from all persons interested in joining our survival group. Send email to language@webpal.org (*Bruce Beach*) for more details.

DOOMSDAY

MYTH #01: Almost everyone will suddenly be killed on doomsday.

You will survive doomsday. And here you thought that if it ever happened the bomb would fall right on you. Probably not. It will more likely go like this.

One day, the inferior Russian computers may make a mistake and decide that the US has already launched a pre-emptory attack against Russia. The US warning system has made that same sort of mistake many times and a number of times we have gotten just minutes away from launching our retaliation before the mistake was discovered. Who is to say the Russians will always be so smart?

Forty minutes after a missile is launched from Russia it will be landing on its target in North America. Before this occurs the US has just minutes within which to respond or it will be caught with its missiles down. The hotline to Russia happens to be not working (this has also happened a number of times before). That is one of the factors that entered into the Russians decision to launch.

So, what's his name in the White House reaches for a jellybean and pushes the button. Interception missiles of course try to stop the Russian missiles before they reach their first two primary targets, NORAD (NORthern Air Defense) headquarters in Colorado Springs, Colorado and its backup at North Bay, Ontario.

These are hardened underground computer and communication sites that may require several bombs to wipe them out. Given the number of missiles that may be intercepted the Russians have sent a handful.

A better way to wipe out the communications of North America is to just explode four thermonuclear devices at a high altitude over the continent. These will generate an EMP (Electro Magnetic Pulse) that will knock out most electric and electronic devices tied into the power grids. It will also knock out any new devices that contain IC's (integrated circuits) and that have an antenna over thirty inches

long. That means that your car radio, portable radio, and television will be inoperable, even if the power ever does come back on.

All over the continent the power and lights will suddenly go off. If you happen to be listening to a battery operated old tube type radio (when did you last see one of those?) that is tuned into a "hardened" transmitter sight (I don't know where you will find one) that transmits (fat chance) the EBS (Emergency Broadcast Signal) then you will know that doomsday has begun.

Otherwise you will be standing out there with the rest of us survivors saying, "Nice day, eh? Strange the power would go off on a nice day like this." Silence. The sun will continue to shine, and the birds will sing, and the breezes will blow and you will still not know that they have a bit of a problem up in North Bay. They are no longer there. Silence.

Eventually word may drift in. On the chance that there is something to the rumor you decide to try to call someone. Your spouse, a friend, a relative. Don't bother. Silence. The telephone isn't working either. Even if the EMP hadn't done it in, a mere power outage causes such an overload of demand on the central exchange that you couldn't even get a dial tone.

You are a survivor. Doomsday has occurred and you are a survivor. While you are waiting for the spouse and kids to get home maybe you should do something practical. Like go down to the supermarket and lay in a bit of an extra stock.

You may notice that the little corner store has closed. If he has believed the rumor, he wants to save his stock. And besides, your money may not be worth anything tomorrow. You thought you had seen rapid inflation before but this is like from zero to a million in sixty seconds.

At the supermarket, if you are early enough, you will find pandemonium. If not, you will find practically nothing. Maybe a large bag of dog food (take it) and some cans of floor wax (forget it). The rest of the stuff was all in those carts that you met come flying up the walk as you came running down.

There won't be any girls at the cash registers, (they have done their shopping and gone). Besides, the cash registers aren't working anyhow, with no power. It may have taken the hired manager a little longer to figure out that he should grab what he can and head home to his family, but he has probably gone now. The only cops you will see are the one's grabbing stuff themselves.

If on the way back you spot a shopping basket with something in it - think twice before helping yourself. If there is an altercation there are probably no doctors at the hospital to sew up the lacerations. Everyone else is also too busy to bother calling an ambulance, if they could, and one wouldn't be available if they did.

Of course the trip to the supermarket may have been nothing like that at all. It may have just been a bit more active than usual but if most people haven't caught on yet then we are very lucky. You just keep mumbling under your breath. "Good people, good people - that's the way, that's the way, just stay calm." This way we can just go about doing what we have to do as quickly as we can, while trying to not stir up panic. "Yes. I understand the cash registers aren't working but please let me just help you add this up by hand. No, that's fine, just keep the change."

Then, of course, if everything is really this calm we can take that good old plastic credit card and go out and buy all the good survival stuff that we are going to need and should have gotten beforehand.

Don't worry about paying for it, no one is ever going to send you a bill. Getting the stuff home may be a bit of a problem if the car isn't working (the EMP may have wiped out that fancy electronic ignition). "No, that's fine. You don't need to deliver it. I'll just put it here in my little red wagon." But you sure don't want to lug it all the way up to your thirty-second floor apartment, if there is somewhere safe that you can stash it. "Can you really believe that people are staying this calm? How is it that we seem to be so much smarter than the rest?"

More than likely you are now back home and all you have is the fifty-pound bag of dog food. Are you really going to be able to carry it up to your thirty-second floor apartment? You know the elevators aren't working of course. Then maybe you could hide it in the trunk of your car in the garage- if no one sees you.

Ah, back home in the apartment. Home sweet home. The kids are home from school now. Do you have enough guts after that scene at the supermarket to send them out to do some more scavenging? It isn't exactly a party going on out there. Did you see Watts, Detroit, Washington D.C., and Baltimore after some of their similar parties? I did. I think I would keep the kids home. Not much you can do except to wait for the spouse to walk home. Shouldn't be more than a few hours.

The spouse finally makes it home. "What do you mean all you got is fifty pounds of dog food? We don't even have a dog." The electricity isn't on. We can't cook anything anyway. Best to eat everything out of the refrigerator before it spoils. Won't be anymore water as soon as the gravity feed tanks on the roof empty. Hope you saved a few pot's full. If everyone filled up their bathtubs - it is all gone. It has gotten cold. Might as well go to bed. There is no light to see anything by anyway. Certainly not going out in those streets in this dark with all that noise going on down there. Hopefully, everything will look brighter in the morning.

Day Two

Morning comes early with the noise of people throwing pots and pans over the sides of their balconies along with the blankets, pillows and other things that it saves them carrying down. Apparently some of the residents are moving out. Perhaps you should too.

Everything looks better in the light, doesn't it? TV still doesn't come on. Telephone isn't working either. And you know what - the toilet doesn't flush. Can't cook anything. Got to eat what you've got. See, that wasn't so bad. Make it sort of a picnic. Eat it right out of the can. There is not going to be any water to wash dishes.

But see, **we survived doomsday**. Didn't even see an explosion, hear a bomb, or anything. Maybe we should sit down together and try to figure out what we are going to do from here. The bombs may still be coming. Probably are.

If the attacker's plans have gone according to schedule they have probably finished with their primary targets. They have hit the three Titan Wings in Kansas, Missouri and Arkansas (three wings, eighteen missiles each, for a total of fifty-four) or the things have landed in Russia by now, so why bother. They have certainly been knocking the bejammers out of Montana and the Dakotas. Can't hear or see a thing from here of course.

Then they will start on the secondary targets. All the SAC (Strategic Air Command) bases both in the US and around the rest of the world. Oh, they have lots to keep them busy for a while. Cities

themselves are pretty far down the list. Maybe they won't even go for them. Any airport with over a ten thousand foot runway is pretty important however because the SAC could land and refuel their bomber there. So you know where that puts us. They will probably get around to us in the next day or two.

There are two strategies of warfare. One is called *counterforce* and the other is called *countervalue*. With counterforce you knockout the enemy's forces so he can't harm you. This can be very chivalrous like the fighting codes of the knights of old. You never harm the women and children.

On the other hand, with countervalue, after you go after everything the enemy holds dear in order to demoralize him. This was the technique of the Mongolian hordes.

"Take no prisoners." "Eliminate the enemy." "The only good Indian is a dead Indian." "Eliminate the Jews." "Sock it to the Japs."

Women, children, babies, everybody goes.

Now the problem with countervalue warfare is if everybody knows they are either going to win or die, some people can get very tough. So maybe the best thing is to knockout the military forces and hold the cities as hostage. "Now, either surrender or we bomb the cities." Anyway, the cities aren't generally the first targets.

And so here we sit. **Unscratched**, the day after doomsday. But we can see some problems on the horizon. Very possibly the city is going to be bombed in the next day or two. Even if it isn't, how can we stay here? The electricity is off. The heat is off. The water is off. And it isn't coming back on. The elevators aren't working. For older people it is "If we go down (if we can go down), we can't come back up."

There is no more food in the grocery store. And there won't be any more. (Unless you believe your government, which says they will start delivering it in about two weeks - want to bet?). Then there is that horrible stuff called fallout that is going to start showing up in about twenty-four to forty-eight hours.

Now, we have all seen or heard about the book and the movie "On The Beach", and Beach himself shows up with the *solution*. A pocket full of cyanide pills. If you want one he will give you one for each of your kids or grandkids. There is only one catch. There are only so many and I don't want them wasted. So you will have to line up each of your children or grandchildren in a row and pop it down their throats right while I am here. How many of you will do it? "Here is your vitamin. Open wide..."

No? Then you really are a survivor. Here you always said you hoped the bomb would fall right on you and then when I offered you an easy out... Oh well, it won't be that bad. A world without electricity, automobiles, radio, television, telephones, and supermarkets. And maybe eventually with only twenty million people in North America. (They won't all be Canadians).

But then, that is the kind of world that was here in 1800. The people then didn't have cars, supermarkets, movies, TV, radio, telephones, modern medicine, airplanes, rockets, and computers. And they survived. They may have even enjoyed life. Maybe even more than many people do today with all their drugs, tranquilizers, and what have you.

People generally are survivors. Put them out on an ice floe in the middle of the arctic with no expectation of rescue, no supplies - nothing - and they will hold on. Some will even survive until they happen to be rescued.

So you are a survivor and you survived doomsday. But you will eventually die. We will all eventually die. That is the nature of this world. The question is not whether or not you will possibly die, but how long you will live, and what will life be like during that time.

So you have survived. And if you and your kids are going to continue to survive you had better get the heck out of the city. Not only is there the possibility that there will be bombs but those little scenes down at the supermarket, or anywhere else a little bit of food happens to show up, are going to become more and more unpleasant as anarchy prevails.

Moreover, without the toilets flushing and with no one removing the dead bodies, health conditions are really going to reach a state you just wouldn't want me to describe. So, off to the country. But, how? And, where?

Before actually departing for the country let us further consider the alternative of staying in the city. Perhaps you are convinced that the Russians would never really get around to bombing your city. Or you feel you have sufficient underground shelter if they do. Nothing, of course, would protect you if there were a direct hit on your shelter, but a good bomb shelter could certainly give you very good protection as little as five miles from ground zero.

The trouble is that subways and underground garages are not designed as blast shelters. They do not have blast vents and doors. Anyone in such a place, at the time of blast, within a couple of miles of ground zero will be subjected to a phenomenon called *popcorning*. Minute particles of greatly accelerated sand will cause blisters to pop out all over exposed parts of the body. This, combined with several other pathological mechanisms, will probably result in a rather painful death within a few days.

Although the blast protection in an underground shelter is much superior to being above ground there are reasons that one is better off staying in their high-rise apartment rather than going to a large public shelter if they feel there is little or no danger of blast.

The public shelters have no supplies and no equipment. The average designated public shelter is supposed to shelter over three thousand people. Can you imagine the anarchy and conditions there? Without food, the first to die will be infants who are not being breast fed. Other early candidates will be persons who require special medications (especially the elderly) and anyone who happens to be injured.

Not only will deaths have negative psychological effects on the survivors, they will create severe sanitation problems. There will be enough sanitation problems anyway if the water and sewage systems are not working. Most of the designated shelter locations do not have sanitary provision for three thousand people in the first place.

One of the greatest hazards in an underground shelter is carbon dioxide poisoning. The designated public shelters, almost without exception, do not have adequate ventilation for large numbers of people over a considerable period of time. And the existing ventilation systems generally depend upon electricity being available.

There are ventilation defense and survival techniques available. However, if you were to try to implement them in a large public shelter situation you would probably be one of the first persons killed by the other survivors. The reason is that most people have misconceptions about either the air becoming radioactive, or containing radioactive particles that they feel would be more dangerous than the carbon dioxide.

Add to these problems the fact that you might not have any light in the shelter, that anarchy may become rampant, and that there will almost certainly be no food, and perhaps, more importantly, no water and you will see why no trained survivalist would want to be caught dead in the place.

Returning to one's own high rise apartment, after the danger of blast is past, gives much more favorable opportunities for continued survival than given by remaining in a public shelter. If you are ten or fifteen stories above the ground the distance will probably adequately protect you from any radiation from the fallout on the ground. If there are ten or more stories above your head then that distance will also protect you from fallout on the roof.

The apartment dweller should try to secure an inner room without any windows. A blast fifteen or more miles away will knock out the windows and it is the glass shards that will kill most people. Pulling drapes and blinds are all helpful defenses. A blast wave will be preceded by a brilliant flash of light. The survivor will have from several seconds to three or four minutes, depending upon the distance from the blast, to duck behind a sofa or to take other shelter.

Training oneself to take similar immediate defensive action can also help give protection from the intense thermal radiation that accompanies a nuclear blast, and that can start fires *fifteen to twenty* miles from ground zero. Fires, in themselves, can be a problem and if you are downwind from a large fire or firestorm you have to watch out for carbon monoxide poisoning.

Fire defense techniques are generally well known so I will not dwell upon them here. One thing you need not do is call the fire department, if you could. There is little they could do, if they were still around, without central water supplies. But the thing you can do is improvise closings to seal off all the apartments above you, and those immediately below you, so that fallout will not blow in and settle on the floors over your head, or otherwise near you.

Now, it may be possible to organize your activities with other survivors to become a cliff dweller like those of old. A bucket on a rope might be used to haul up water gotten from a nearby stream or pond, and waste could be let down in the same way.

Some ingenuity may be required in providing heat and light, but if you really have sufficient supplies of food for yourself and your fellow survivors to hold out until another crop can be planted and harvested (most survivalists recommend at least two years supply), and you seriously face up to the sanitation problems created by morbidity, and you and your co-survivors are sufficiently organized against anarchy, and there are no more nearer bomb blasts - then you are probably well on your way towards continued survival. At least you are many times better off than being in a public shelter.

There may be all sorts of reasons why you elect to remain in the city rather than head for the country. If the attack comes in the winter and you do not have a planned escape route, adequate clothing and supplies to make the trip, are not physically able to make the trip, and do not have a known destination of refuge, well then...

Those who have most prepared themselves and have made the best plans should pray that their flight does not come in the winter. During a storm, or severely cold weather, it is very likely that many more persons may be killed by exposure than by any other single cause. The roads and highways will most likely be jammed. If there has been an explosion in the vicinity then overpasses and utility lines may have been dropped onto the roadways making them unusable.

Even without a blast having occurred, traffic jams, accidents, or vehicles just running out of gas will probably create bottlenecks that completely clog the roads. Once people find themselves just sitting there, not moving, they will abandon their vehicles. My guess is you can forget using an automobile for escape unless you had a plan and immediately implemented it before the general panic set in.

A motorcycle, scooter, or even a bicycle might offer certain advantages over an automobile. One might carry a smaller form of conveyance on a larger one and then implement the smaller means of conveyance, such as a bicycle, when that became the necessity.

The most dependable means of escape would probably remain walking. If one had to walk all the way out, and they were in any physical shape at all, they could surely do it in two or three days. Once again, proper preparation can make all the difference. Proper walking gear, proper survival clothing, a planned escape route, proper selection of material to be packed, and proper allocation of loads.

And, as before, there are better alternatives. One could have pre-arranged pickup points and times with co-survivors coming from the refuge destination, or in a worsening pre-crisis situation you may have made an early dispersal. But the greater likelihood is that anyone with a practical survival plan who reacts immediately can get out well before the rush sets in.

Just getting out into the country, or to the other side of the mountain, will increase the survivability factors for many people. The threats of blast and thermal radiation will have been greatly reduced. But blast and thermal radiation while very nasty in their effects are not going to kill that many people anyway. Oh, they will kill millions, but as a percentage of the people living the day before doomsday they will, combined, kill only ten to fifteen percent. And most of these will be a considerable distance from the blast and will eventually die as a result of injuries caused by the broken glass shards.

As stated before, depending upon the time of year and the weather, many more may be killed by exposure. But there is still another big killer coming. That is of course the fallout from the weapon explosions that took place many hundreds of miles away. This fallout may require from a few hours to a day or two to arrive. If the weather permits, and the survivors know what they are doing, they may still have time to build an expedient shelter against the fallout.

Techniques for defense against fallout have been developed and tested at great expense by almost every nuclear nation. While information on these techniques has been made readily available, most people have not availed themselves of it.

Two basic techniques are available. One is to leave the contaminated area. But the extent of the contaminated area may be far too wide to escape, or one may not have accurate information as to the delineation of the contaminated area, or they may not have the means of transportation, nor the means of survival should they reach a radiation free area.

The other basic means is to provide shelter within the contaminated area. Weather, ground, and time

conditions permitting it is possible to dig a trench and cover it with dirt supported by poles, wooden doors, or a vehicle. Properly designed, such an expedient shelter can make all the difference between avoiding the effects of fallout radiation, and not avoiding those effects.

The details of how to build an expedient shelter are to be found in books listed in the [bibliography](#). One of the most important and often overlooked factors in designing a shelter is the matter of providing an airpump so as to eliminate the problem of carbon dioxide poisoning. The technique for building such an expedient pump from materials readily available in time of crisis is also found there.

The effect of fallout radiation is not always death, although many times it is. Even if it is death it is not immediate death. Intense radiation causes a very painful, and horrible death (what the literature calls a *hard* death) over several days. More likely the effects are drawn out over a period of weeks, months, or even years. As the title of this document points out, all these people will have survived doomsday. It is not a question of survival but the condition of survival with which we must concern ourselves. Everyone will die eventually but it is the quality of life in the interim that is of importance.

MYTH #02 Most people would be quickly killed by the bomb blasts, thermal radiation, or radioactivity.

By the second year after doomsday the combined affects of blast, thermal radiation, and fallout will probably have resulted in some immediate, but mostly delayed, deaths accumulating to 35% of the population that were living on doomsday. Deaths that can be directly attributed to radiation and weapon related injuries will continue until five years after doomsday so that by that time 40% of the population that was living on doomsday may no longer be surviving because of the above named factors.

However, the total population surviving five years after doomsday will probably be only 20% of the number that was living on doomsday) Obviously, nearly half, or perhaps more than half, of the fatalities will be directly contributable to causes other than the bombs.

What then are these equally effective causes of post doomsday mortality? They are exposure, starvation, plagues, and anarchy. While the threat of chemical and biological warfare is not to be ignored the primary causes of these means of mortality can be looked upon as being more *natural*. That is to say they will just result naturally from the breakdown of the social infrastructure that we regularly depend upon for day to day survival.

The four factors that will determine survival are

- Location
- Knowledge
- Preparation
- Luck

On doomsday most people will be living outside of areas that will be struck in initial attacks by blast or thermal radiation. Many others will already be living in areas that will never be damaged by blast or thermal radiation. Both of these groups, if they have the knowledge of what to do, and have made the proper preparations, will very likely find themselves in the group of survivors who are living unharmed five years after doomsday when the surviving population has once again established some semblance of order and is once again multiplying and replenishing the earth.

Selecting and Designing a Shelter

MYTH #03: You can build an adequate shelter in your basement.

For a number of reasons, basement shelters do not offer the amount of protection that is commonly supposed. A proper analogy between them and a survival installation as described later in this document would be to compare a plank with a well-equipped and commanded lifeboat. This is not to say, that if someone finds themselves in the water from a sunken vessel, it is not well to advise them to grab hold of a plank and start paddling in the direction that one hopes there lies shore, if there is no better means of survival, such as a lifeboat, or raft.

Similarly, there is very little protection afforded (starting from the rooftop down) by a layer of shingles, a foot or two of light insulation (composed mainly of air-spaces for the purpose of retaining heat), a quarter to half inch of plaster board, some paint, a carpet on the floor, another layer or two of thin boards, and perhaps some paneling or ceiling tiles if the basement is finished. The distance between the roof and the basement (a two-story house offers more than a bungalow in this way) does allow some additional protection, but this factor, along with the combined density of all the matter described, would not equal more protection than would be afforded by six to eight inches of earth.

When, within such a basement situation, one starts to create an expedient shelter using, as is usually advised, such materials as bookcases and trunks (filled with earth if possible), there are certain design errors that are liable to creep in. Piling dirt or other material on the floor above will help but the greatest dangers will be from the areas outside the basement wall where the foundation extends above the ground. It is best to keep ones shelter at least three feet below the outside ground level, and to have at least three feet of soil above one's head.

The next most overlooked problem is that of proper ventilation, so as to avoid carbon dioxide poisoning. As stated before, most survival experts advise a location other than the basement for such reasons as the threat of carbon monoxide poisoning in case of fire, broken gas mains, and the threat of fire itself that may result from the wide spread firestorms caused by the thermal radiation associated with a nuclear blast.

There are certain advantages to a basement shelter. One may have access to necessities such as food, clothing, and blankets stored in the home. There may still be water available from the hot water tank. And, most importantly, one may feel certain psychological comfort by being in the familiar surroundings of their own home. None of these advantages of course hold a candle to the advantage of being in a properly equipped and manned survival center.

MYTH #04: You must filter the air coming into a shelter to remove the fallout.

One of the general misconceptions regarding fallout and fallout shelters is that the air itself may become radioactive. This is simply not true. Those with a little learning will then say "Ah, yes, but it will contain radioactive particles of fallout". That is true, but a properly designed air intake, even for an expedient shelter, will cause most of the particles to drop out of the air flow before the air enters the shelter.

Should the number of particles still suspended in the air be a problem, an expedient filter, such as a damp sheet hung in the air intake passageway, will do an adequate job of filtering the air.

If the air vents do not have automatic blast valves then the air passage should be quickly shut and remain shut for a few minutes after the brilliant flash of a nearby nuclear explosion (so as to prevent the popcorning effect described earlier). The air passages will have to be shut in every case where there is a large fire nearby that is generating carbon monoxide that would otherwise seep into the shelter.

Most expedient shelters will not have precautions such as those just described. The danger of carbon monoxide poisoning is one of the main reasons that most survival experts recommend that even if one has a basement in their house it is preferable to build an expedient shelter a considerable distance outside and away from existing structures in case of fire.

MYTH #05: Water would become radioactive.

As has been mentioned before, the materials necessary for building an airpump, and an expedient radiation detector, are available in almost every home. Anyone planning on attempting to use the basement survival method should obtain ahead of time the detailed instructions for building these devices, and store these instructions in their home, along with an emergency supply of food and containers for storing approximately 14 gallons of water for each individual that is going to be accommodated.

There is a similar misconception about water becoming radioactive as there is about air becoming radioactive. This may have something to do with misconceptions about the nature of *heavy water*, but we won't go into that here. Radioactive particles do become suspended in water, however, and that is why for the shelter confinement period, you must make sure that you have a sufficient store of potable water available ahead of time.

During the recovery period, after radiation has decreased to the point where it is safe to work outside, there are techniques for letting fallout settle out of water, and for distilling water, in order to make sure that it is safe for drinking and cooking. However, far from keeping air and water out of a shelter, it is absolutely necessary to life that they be available.

While an expedient shelter could mean the difference between life and death, it is probably not something that you would want to continue to use for a very long time.

MYTH #06: There would be no dangerous radioactivity after a couple of weeks.

There is a wide range of misconceptions about what is safe and what is not. The matter is sufficiently complicated that a person should have professional advice. However, if there was no doctor going to be available to set a broken leg I presume you would go ahead and do the best you could. And if one had to build a bridge to get across a river and there was no structural engineer around, again I presume one would have a go at it.

Doctors would like to have their x-ray machines available when setting a leg, and engineers would like to have their surveying equipment, specification guides, and computers or slide rules when they are building a bridge. So you can well imagine a radiological defense officer would like to have radiation detection equipment available when giving advice in a radiation defense situation.

However, if the advise, expertise, or equipment, is not available, one must go on. One rule of thumb

is that if there is not enough fallout that you can see it, then there is not enough of it that it will kill you. Fallout is usually small grain dust or grit, often having a light color, but not always. It depends upon its source. The best place to spot it is on a smooth surface, like the hood of a car.

The more dense fallout is, probably the greater the hazard, although there isn't necessarily a direct correlation. It may fall thick enough that quite a little heap of it may be brushed up from a surface that is one foot square. It is possible to build, from common materials found around the home, an expedient radiation detection meter. The details for such a meter are found in books listed in the [bibliography](#).

Even if one has commercially available radiation detection equipment there is still some considerable skill required in its use. For example, almost all survey equipment is designed to be used by an adult of normal stature. This means that if the equipment is held in the hand of a walking adult it will tell how much radiation is being received 3 1/2 feet above the ground, and particularly by the adults vital organs which are above that level. A child's or an infant's vital organs will be below that level and will be exposed to much more hazardous levels than an adult's. For this reason, if one is passing through an area that is suspected to have any radiation at all, a child should be carried on an adult's shoulders.

There is another rule of thumb that for every seven fold increase in time radioactivity will decrease by ten fold. This is called the seven/ten rule. This is based upon standard decay. It is useful as an example, for training, and in building theoretical models, but in actual practice the decay rate is likely to be something quite different. It is determined by the isotopic composition of the matter under consideration.

There is another commonly held misconception among semi-trained individuals that low levels of radiation cannot be rapidly fatal. Someone, after several days in the confines of a cramped expedient shelter, might conclude that because their meters now indicate a very low level of radioactivity (or perhaps no radioactivity if it is a high-range instrument), that it would now be all right to go outside and sleep on the ground in the cool breezes beneath the bright summer stars.

The fallacy again arises from taking measurements at a level that assumes the vital organs are well above the radiation source. This is not the case when a person is stretched out on the ground for long hours of sleep. These long hours of low level radiation exposure to the vital organs will result in a fatality in just a few days.

Likewise, perfectly healthy adults who take infants out of the cramped, unpleasant, expedient shelter to allow them to play during the day on a blanket spread out on the ground will be quite shocked to see those infants sicken and die in just a few days while they themselves remain healthy. The infant's vital organs again being close to the weak radiation source for a long period while the adults' vital organs are being protected by distance.

MYTH #07: Radiation sickness is not contagious so there is no danger in assisting those affected.

The statement that radiation sickness is not contagious is often found in the literature. That is true. The erroneous conclusion is drawn, however, that being around persons with radiation sickness is not dangerous. The danger arises from the manner in which radiation kills.

Sufficient radiation can cook the vital organs, but more often what happens is that it kills the white corpuscles and the ability of the bone marrow to make more of them. It is the white corpuscles that are the body's defenders against viruses, bacteria, and other disease causing bodies.

Once these defenders are lost the person succumbs to a disease they might have otherwise warded off, and once that disease takes hold in the individual they may become highly contagious.

In this manner there is grave danger of plagues breaking out, and all sorts of illnesses, one does not generally see, becoming very threatening. For this reason rigorous quarantine, sanitary measures, and health defense measures must be imposed and enforced.

Becoming aware of such unexpected and unpleasant snares may initially make one feel that the situation is hopeless. The danger really arises from a person's unfamiliarity with the circumstances. There is the story of the explorer who asked the young native if there were crocodiles in a certain stream. He was assured there were not. While then swimming in the stream he once again saw the young lad on the bank and asked for reassurance that there were no crocodiles. "Oh no sir!", replied the shocked young fellow, "They won't come here. They are all afraid of the piranha."

The young fellow would have found himself equally in danger from things with which he was not familiar in our society, like automobiles and electrical appliances. It is not that the hazards are so onerous, but simply that we are not familiar with them.

FOOD - Some Important Considerations

MYTH #08: Food exposed to radiation becomes radioactive and is therefore not edible.

Food is the most serious problem. Most food that is in the house will not be harmed by the radiation, no matter how intense. There are three types of radiation that are found in fallout. Alpha particles, beta particles, and gamma rays. As the first two names indicate, they are particles. They are minute (too small to be seen) pieces of atomic matter that attach themselves to the fallout (bits of dust that may or may not be large enough to be seen).

In any case, these particles may be simply washed off many types of foods that have a natural covering, such as eggs, bananas, potatoes, oranges, etc., or off well sealed foods such as those in vacuum packed cans. Foods such as grains (rice, dry cereals, etc.) that are in partially used packages that have been opened should be viewed with suspicion. Fallout dust may have crept in.

The food in its unopened container or natural covering should be rinsed under flowing water and then placed on a surface that has been similarly cleansed, before opening. Make sure that the hands (and under the nails) have been thoroughly cleansed before handling the food. There is little danger in handling such articles. The radiation given off by these particles is so weak that it will often not even penetrate something as thin as the cellophane wrapper on a package of cigarettes.

You may ask "Why be concerned?" The reason is that once these minute particles are ingested into the biological system they will get into the organs and the very bone marrow itself where they can do a lot of damage. This is not to say that you need not worry about getting the alpha and beta particles on your skin. You do. Because they can cause skin burns. However, good hygiene practice can

eliminate the problem and they are a much more severe hazard internally than externally.

MYTH #09: If you have a special *radiation suit* like you see in the movies and on TV you will be protected from the radiation.

As an aside, this is one of the reasons that those *fallout or radiation suits* that you see in all the pictures and movies and on TV are such a **joke**. Those things are not going to protect the guy from anything, that a couple of good garbage bags wrapped around his feet and made into a hood to go over his head, would not do as well. In fact the garbage bags are in many ways better. They would be considered disposable.

The main purpose of the fallout suits is to prevent the wearer from tracking the fallout into the shelter. The user simply takes the suit off at the door. If the person were to wear it on inside, it would defeat the purpose. There are some clean handling techniques that are beneficial to know and practice, but in a wartime situation there is so much of the stuff around that peacetime standards of exposure and cleanliness lose their meaning.

The gamma rays are another matter. They are very penetrating. No fallout or radiation suit is going to protect you from them. It requires much more dense matter to protect you than you could lift, let alone lug around. This is why one must remain in a shelter when there is intense radiation. With good housekeeping there should not be so much dust inside a shelter as to create a hazard from gamma rays. However, be sure to dispose of the contaminated rinse water that you have used for cleaning the food containers and persons returning from outside. It may contain matter that is giving off gamma rays.

There will probably not be sufficient fallout on the food packages (or you can get rid of it quickly enough) that you need concern yourself about the amount of gamma radiation that you are going to get from that source during the decontamination process. However, the food may have been stored in an area that has received very intense radiation. That can of beans or peaches may have been stored right out there where it was receiving 1000 roentgens of radiation per hour. An amount that would have killed you right away. But it will not be harmed.

That is right. It is perfectly edible. If it were not so I would have told you. It is only living things that radiation hurts. Even then it depends upon the frequency and intensity of the radiation. For example, there are all sorts of radio and TV waves going right through where you are sitting right now and they are not harming you.

The food in the can is already dead and the gamma rays are not going to harm it. They will not make it radioactive. If the radiation is strong enough it may kill any bacteria that happen to still be living in the food and thus preserve it even further. If the food is supposed to contain bacteria (such as yogurt) I am not sure what it would do for that!

Radiation preservation of food is a technique that is already being used in industry and will probably become much more widely used in future years. Many people already have radiation (microwave) ovens in their homes today. One further analogy. Fire will kill living animals but we use it to cook our food. You really shouldn't be overly frightened about radiation, either.

MYTH #10: New crops of food grown in future years will not be radioactive.

Food that is grown in radioactive soil, or that has not yet been harvested when, fallout falls on it is another matter. This food will absorb the particles of radioactive matter into its own structure and thus become dangerous.

The biological food chain acts as a marvelous strainer and concentrator of radioactive isotopes. This was well demonstrated in certain tests that took place at Almagordo. From some intentional surface bursts and because of the unintentional venting of some underground bursts there was some fallout carried onto the milkshed for southern Utah.

The amount of fallout deposited over the surface was so slight that the most selective instruments could not detect it. An atomic or nuclear explosion releases its great amounts of energy by changing some matter into energy. It also changes certain amounts of matter into new and different types of matter. Without going into detail about atomic theory, the nature of the atom with its electron rings, and its nucleus consisting of protons and varying number of neutrons, let us simply say that these new forms of matter are generally unstable isotopes. That means they are going to change into another form of matter.

Once again, the matter, in the process of changing from one state to another, releases certain amounts of energy. It is this energy that we measure as radioactivity. The energy, depending upon the isotope involved, may be rapidly dispelled or it may continue to be released for a very, very long time. Most unstable isotopes release their energy and transform into a stable state within fractions of a second or at least within minutes after a nuclear explosion. Others take hours, and still others days, weeks, or months. Some take centuries.

Each isotope starts out with just so much energy. For all practical purposes we can say it is not going to get any more. Once that isotope has released all its excess energy it will become stable. Since the isotope releases its energy at a specified rate we can say how long it will take to lose half of its energy. After that, it will then take the same length of time again for it to lose (give off) one half of the remaining amount of energy. Question: When will all of the energy be given off by the isotope?

An ancient Greek philosopher posed the same problem. He said, "Suppose there is a bear at the back of a cave. On the first day the bear walks halfway to the entrance. On the next day he walks half of the distance that remained to the entrance after the first day. And on the day following the bear walks half of the distance that remained to the entrance from the previous day. The bear continues to do this same thing on each subsequent day. He walks half of the distance to entrance of what was left from the previous day. The question is: when will the bear get out of the cave?"

The answer is: "Never." This sort of regression is what mathematicians call asymptotic. That is to say the figures continue to approach zero, closer and closer, but they never reach it. So just as the bear never gets out of the cave, all of the energy is never lost. But much (one half) of the energy is lost in the first half-life. And three quarters of the energy is lost by the end of the second half-life. After ten half lives a very large percentage of the energy is gone.

It is because so much of the energy is lost in the early periods (half-lives), as compared to the later periods, that it is important to be in shelter during the early periods after fallout has fallen. We might divide the half-life times of radioactive isotopes into three categories. Very short term, medium term, and very long term.

As mentioned earlier, most of the unstable isotopes generated by an atomic or nuclear explosion are

very short term. They give off all their significant amounts of energy in a matter of seconds. Unless you are within very close range of an atomic or nuclear bomb there will be no way for this radiation to reach you. It was this initial radiation that caused the horrible radiation burns and sickness at Hiroshima and Nagasaki.

First the good news. There will not be any persons subjected to long suffering from the initial radiation by the nuclear weapons of today. The bad news is that the reason why is that the weapons blast such a large hole or create such a large area of complete destruction that the initial radiation can't escape. That is to say the totally destructive blast extends beyond the range of the initial radiation.

On the other hand, the survivors of Hiroshima and Nagasaki did not have much problem with fallout. The first major victims of fallout were some fishermen many, many miles downwind from the Bikini Island tests. Fallout is a phenomenon much more associated with nuclear weapons.

Nevertheless, there was fallout in Southern Utah. As stated before, it was so slight it could not be detected by the most sensitive instruments. The specific matter of interest in southern Utah was the isotope 131 of iodine. This was absorbed by minute bacteria in the soil. In the process of filtering the iodine out of the soil they greatly concentrated it.

The bacteria were absorbed by legumes and other biological forms higher in the food chain. Each in turn further concentrated the iodine isotope.

Finally, after the iodine had found its way into the grass a cow came along and ate it. Now a cow is a very complex organism in itself. There are all sorts of biological activities going on in a cow. Various organs and the bone marrow filter out different minerals for different purposes. One of these complex systems forms milk. This particular cow, and hundreds of others like it, was milked, and the milk was bottled and distributed to children all over the area of southern Utah.

The children were also complex biological organisms. They in turn had numbers of specific organs that specialized in straining out various minerals and compounds from the food that they consumed. The end result was that their thyroids once again concentrated the iodine 131. And this to such an extent that if you held a radiation detector next to their necks it buzzed like a rattlesnake. This was not healthy.

In fact numerous problems developed among the population. There were a great number of mentally retarded children born, and a number of other unpleasant ramifications. This need not have occurred from the iodine 131 if we had known what we know today.

MYTH #11: There is no such thing as a fallout pill.

There is a simple pill that would have prevented the difficulty. It is supplied in every nuclear emergency kit in Russia and available in Denmark and Sweden. Unfortunately it is not sold in North America.

Fortunately, however, the pill is quite simple to make. Ahead of time, obtain a quantity of potassium iodide from your local drug store. Five dollars worth should be lots. When needed, take a regular glass and fill it a fourth or less full of water, and then slowly start pouring in the potassium iodide while thoroughly stirring the water.

Don't worry about how much you pour in. You cannot pour in too much. After a while you will notice that the chemical no longer dissolves in the water. It just lies there on the bottom. This means that the water is saturated. You can now stop pouring in the chemical. More will not help or hurt.

Next take an eyedropper, or a soaked piece of paper if you do not have an eyedropper, and drop four drops onto a little piece of bread for an adult. Or two drops for a child. If you get several times that amount it is not going to harm you (although in much larger amounts it is a poison).

Now take some butter or margarine and make a little ball out of the bread and pop it down. Tastes awful. Ugh. Take once a day for 100 days after the last bomb falls. This is good stuff and you should have it around for reasons other than defense in case of a nuclear war.

If you live anywhere within in a couple of hundred miles of a nuclear generating plant you might suddenly find yourself needing the stuff. The US department of Health rushed a supply of pills to Three Mile Island and they have a standard brochure all printed ready for distribution in case it or some similar site vents.

The department of defense also keeps a supply near the old Titan sites that are deteriorating and breaking down. Canadians have nothing. I'll take that back. They do have lots of nuclear plants and the distinct possibility of bombs exploding over their heads and on their soil.

The reason why the potassium iodide works is that the thyroid will absorb only so much iodine. After that, any iodine taken into the body is passed off by the kidneys. Since the body already has all the good stuff it wants it passes out the bad stuff. This is what we call thyroid blocking.

Do not try to use the tincture of iodine that you put onto cuts. Taken internally it will kill you. And you cannot eat enough iodized salt to do you any good. You would get salt poisoning long before you got sufficient iodine to do the job.

MYTH #12: There is a fallout pill that will protect you from all radiation.

I wish I could tell you about another pill that would solve all your radiation and other problems. But there is none. Unless you mean the cyanide pill mentioned earlier and things really are not that gloomy. As I hope I have carefully explained, most of the radiation we have to be concerned about from a nuclear bomb will decay in a matter of days or weeks to a level where we can deal with it.

MYTH #13: There would be dangerous radioactivity for thousands of years.

You may say "I've heard that some radiation will be around for thousands and even hundreds of thousands of years". Yes, but those isotopes are our friends. (That may be putting it a bit strongly.) Anyway, they are not near so harmful as many people think. There is the point of view that no radiation is good for you. Some dermatologists maintain that you should not even get a suntan. (Yes, that is radiation that you get from the sun.)

There is even the theory that it is cosmic radiation that causes both overall genetic change, aging, and death. In any case we are all subjected to many sources of radiation every day. The question is not whether or not you are going to receive radiation, but how much and how quickly. Let us compare the radiation we are concerned about with another type of radiation. Heat.

Just as we measure radioactivity in roentgens we measure heat in calories. If I were to tell you that that pipe over there was going to put off a million calories of heat, you might say, "Let me get away from it!". But, if I then said that it was going to be over the next million years, at the rate of one calorie per year, you would realize that you were in greater danger of freezing to death than of burning to death if you were depending upon that pipe for heat.

It is not how much heat is going to be given off (it may be a large amount) but how much over what period of time. A mere two hundred calories suddenly inflicted upon one point of the skin would create a bit of a sting, but hundreds of thousands might be comfortably absorbed from a heating pad over an appropriate period of time.

It is the same with radiation. Most isotopes give off their energy so rapidly that they are like flash bulbs. Flash and they are gone. It just happens right in the vicinity of the bomb. Others are like regular light bulbs that give off their light and heat for some period of time before they burn out. They may travel a long way from the bomb as fallout before they dissipate their energy. For these we need a shelter to protect us if we are in their vicinity. Nothing else will do.

Still others are like those small luminescent lights that some people put in their bathrooms for night-lights. Only weaker still. They just sit there and barely glow for a very long period of time.

Little miniature flashlight bulbs or matches are a good analogy to fallout particles. One or two of them in a room with you will not harm you. But surely you can imagine the situation where if you had thousands and thousands the light would either be blinding or the heat so intense that you would be incinerated.

Fallout is just the same way. A few pieces inside a shelter with you will not harm you, but if you go outside where there are millions of the little beasts lying around then you have had it. The only difference between their radiation and the radiation from a little flashlight bulb or a match is that it is invisible radiation that you cannot see or feel - like that from an x-ray machine.

MYTH #14: There would be no dangerous radioactivity after a couple of years.

After having explained all this, now I must tell you that there are some isotopes that unfortunately do not fall into either the short range of initial radiation (which we do not need to worry about because it does not extend out of the blast area), nor the medium range (that you will be protected from by a fallout shelter), nor the very long range (that decays over so many hundreds of years that their energy is too weak to concern us here).

These remaining isotopes are real meanies. There may be solutions to the problems they present but there are no simple solutions. There will not be enough of them around that they will make walking around dangerous for most people but the problem is that they get into the food chain and that they have relatively short half-lives, between five and 30 years.

That means that during the next couple of hundred years they are going to be giving off most of their energy. Fortunately, some of them are rather rare, and given that they are going to be widely dissipated in worldwide fallout we can largely ignore their effects.

Others may be concentrated in certain areas, certain types of soil and certain foods where we can

avoid them also.

So they will not be that serious a problem.

Some others, however, particularly Cesium 137 and Strontium 90, present mayor problems in keeping them out of the food chain. Even here, there are available defense techniques. For example lime, gypsum, fertilizer, or organic matter (in practical amounts) may be applied to low calcium soil, or naturally high calcium soil may be used for growing certain crops which have an uptake preference for calcium over strontium.

There are known refining and purification techniques for some foods and milk, and there are some new techniques which I have discussed with some of the researchers at some of the leading nuclear laboratories, but which the world isn't ready to hear about as yet.

These methods along with others such as land denial, deep plowing, surface scraping, and selective utilization, are harsh realities that are going to have to be faced by the long-range survivors.

MYTH #15: You are prepared if you have a two weeks emergency supply of food stored.

More important to the present theme are questions as to what preparations survivors should be making ahead of time. Since it will take a while to get crops growing again because of social disorganization, ozone depletion in the atmosphere, climatic changes, crop adaptation, early crop failures, soil deprivation, and similar factors, survivors will need a couple of year's supply of food. Wheat and honey are the only two basic foods, of which I am aware, that have an indefinite shelf life. Thousand year old kernels found in the pyramids have still sprouted. Fortunately, these two foods, wheat and honey, meet most adult nutrient requirements. Powdered milk will be necessary if one wishes to reduce the infant mortalities. The infants will not survive otherwise, unless their mothers have adequate natural milk, which is unlikely. Salt is important as a preservative, among other purposes.

In addition to storing the four basic survival foods (wheat, honey, powdered milk and salt), it is highly advisable that one also store a couple of year's supply of a variety of seeds. Some seeds will not store very well and need to be continually replaced.

It is equally important to develop certain skills. *Gardening skills.* I particularly recommend the area of hydroponics because this would be one way to grow foods free of contamination. *Preserving skills.* Here I recommend learning to dry foods using hot air. Freeze-drying requires too much elaborate and expensive equipment and freezing itself is not reliable when electricity is not reliable. *Preparation skills.* Bread making, use of lentils, and making of many foods, or their substitutes, that today are commonly gotten in prepared form.

On all of these subjects one could write a book. Indeed many books have been written on them. Even if one does not have time to immediately develop all these skills they might do well to get themselves a survival library and then as a next step acquire the essentials in materials listed in checklists in most well organized manuals.

MYTH #16: You should be prepared to be self-sufficient and be able to survive on your own.

The very best thing that a survival minded person can do, after preparing for themselves an equipped place of refuge, and developing their own survival skills, is to associate themselves with other skilled survivalists. No one person can know everything, and almost everyone can contribute something. Agricultural, medical, mechanical, communicator, you name it, all skills will be needed.

Few people could afford the equipment that an organization can have. One well-equipped laboratory for testing for alpha and beta particles in food costs \$5,000. Along with other radiation detection equipment and many other types of emergency supplies, what individual can afford it? Yet no nuclear survival group should be without one.

Even in building a shelter the mayor expense is the entrance and support mechanisms such as emergency lighting, water source, etc. The incremental cost for space for one additional individual is quite small. Thus, the greater the number of people the overall cost can be spread over, the less the average cost.

Moreover, no individual has the personal resources that a group has. If the head of a single family survival group is injured or lost the chances of survival for that group are much reduced. However, if it is a large group then there are numbers of people available to continue to give support. Just like there are numbers of people available to maintain twenty-four hour watches, or to create a well manned convoy to go after necessary supplies. One more prepared and equipped individual added to such a group is an asset, whereas in a situation like a public shelter, one more unprepared and unequipped individual is just another liability.

A successful survival group will have to be either completely homogeneous or thoroughly committed to thoroughgoing tolerance and appreciation of a wide range of individual and preferences regarding society, economics, religion, and future expectations. Still, a shelter is not a democratic society anymore than is a ship or an airliner. The captain's authority is absolute and one should have confidence in his credentials and ability before boarding.

Neither is a shelter a democracy in the sense that there must be much more stringent rules regarding behavior. Everyone must perform assigned duties. There are no wealthy passengers along for a free ride to be served by others. There are many limitations to personal freedoms such as contraband materials. No drugs or alcohol (except under medical prescription and then as approved by the commander).

All firearms and weapons must be placed in the armory and will not be released except under orders from the commander. All valuables will be receipted and stored in the locker for safekeeping. No private stocks of foods because under survival conditions this can lead to social disorder. No tobacco or smoking inside the shelter, since it would cause discomfort to others.

No loud toys, devices, or other objects that would be environmentally disturbing to others. No large bulky items, or great quantities of any item without the permission of the commander. And no pets or animals unless the survival community has made prior special arrangements for their accommodation.

Tough. Yes, It is tough. But not nearly as tough as the conditions of survival will be for those who are not prepared. There are many items that are not prohibited, and in fact are encouraged. A reasonable supply of one's personal religious literature, the tools and resource manuals of their trade or profession, survival manuals and equipment of every sort, additional supplies of food to be put

into the common larder, and extra supplies to be put into the common store.

MYTH #17: Any survivors would have to live the rest of their lives underground.

Many people ask how long they might expect to have to live in a shelter. There are no fixed answers. If your shelter is an expedient hole in the ground you might want to stay in it no longer than was absolutely necessary. Maybe as much as a couple of weeks. If you dug a pretty elaborate hole in the ground you might be able to expand upon it and make it into a place where you could survive through a winter.

If you owned space in a shelter city, like there is in southern Utah or southern California, you might plan to live there the rest of your life. The co-operative shelter that I have been describing in the previous paragraphs is not sufficiently elaborate that anyone would want to make it a permanent home. Some persons would probably be able to find larger and more adequate quarters elsewhere after a few weeks.

Others might improve upon the existing structure and remain there for a year or two until more adequate homes could be built elsewhere. Decontamination procedures would provide work areas, schools, and school grounds outside of the shelter where people would carry on their daily activities after a few weeks. However, it might be beneficial for young children and expectant mothers to sleep in the shelter or a similar structure for several months.

Certain occupations, such as decontamination crews, farmers who work on large un-decontaminated areas, explorers who go into unsurveyed areas, long distance truck drivers, and others who go out of well defined areas for the next several years, will have to be closely monitored to be sure their total exposure does not exceed established limits.

It should be apparent to the reader, from what has been said earlier, that a person may receive substantially larger total doses over a large period of time than over a short period of time, just as with sunlight. A person may easily recover from several small sunburns throughout the years, resulting from staying in the sun overlong for an hour or two each time. If they were to be exposed to the hot desert sun, that many hours all at once, they would succumb.

In the same way one may recover from a number of small radiation burns (although some controversy holds that one never recovers - this seems unlikely), and in just the same way one may receive small amounts of radiation and never feel ill. Just the same, certain biological conditions dictate that certain individuals, (particularly the reproductively active) should receive less radiation exposure and that others may receive much larger amounts.

MYTH #18: Life after doomsday won't be worth living.

Hearing descriptions of this sort some persons wonder if life will be worth living afterwards. For some, most assuredly so. Others do not find life worth living today. How many times have you heard of a person like a famous movie star, who had wealth, fame, beauty, health, the company of famous illustrious persons, opportunities to travel to all sorts of places, and to participate in all sorts of interesting events, the fulfillment of the very aspirations of thousands of young ambitious people and yet that same person committed suicide.

On the other hand there are many individuals who suffer daily from terrible physical afflictions and

all sorts of personal misfortunes. Oftentimes in the greatest poverty. And yet, the world over, down through the centuries, they have gone on surviving. Many actually finding happiness, meaning, and perhaps even enlightenment in life. You will survive. The conditions of that survival are up to you.

Undoubtedly, the events that are about to transpire will have a profound effect upon the attitudes of many people and perhaps upon mankind itself. From the cauldron of the holocaust there may spring forth a new race of men who are less concerned with self-interest and who will come to understand man's true nature and his divine destiny.

Some of us may even feel that this event will herald the coming to maturity of the human race. Instead of no future, mankind may have a glorious future. There will be great amounts of resources available, combined with man's great advances in technology, to build a new and glorious world civilization. Providing, of course, that he has learned from this experience and does not just go about preparing for the next war in another twenty to thirty years.

But, I leave each man unto his own vision. While, to myself, looking upon the immensity of the visible universe, and pondering the events that have happened upon this one single planet circling a solitary sun among the uncountable millions in our but one of the innumerable galaxies, I cannot help but wonder if the events that are about to transpire are not less than all that unique in the repetitive cycles of life and nature that we see about us everywhere.

MYTH #19: You need not make any preparation because you are either going to die in the holocaust or be *saved* (religious connotation).

Men's philosophies today often go to one extreme or the other. Claiming that all is within man's power. Or that nothing is within man's power. There is a middle ground. One can simultaneously feel that nothing can be achieved except by the will of God and think that the results are dependent upon his own efforts. God sets the boundaries and within those boundaries man can have some effect upon the outcome.

MYTH #20: The bombs today are so large and there are so many they will destroy the world.

There are those who feel that the holocaust will destroy everything. And well it might, for there are certainly more than enough nuclear weapons in the world to achieve that end. "Except those days be shortened, none will survive, not even the very elect." But, if it is the Divine Will, those days will be shortened. There are those of us who feel that the Divine Hand is evidenced in the dealings of the world, every moment unto every moment.

The Divine happenings often seem quite natural. If one were to say unto a mountain, "Be thou removed and cast into the sea." and it should occur, another would say an earthquake just happened to happen right then. If the forces of nature should transpire so that in the midst of the holocaust the planet should suddenly tip on its side and place His sign (the Southern Cross) suddenly blazing in the sky above the heads of the people in the northern hemisphere, there are those who would only recognize the natural causes.

Such an event would certainly play heck with the astral, satellite based, and inertial, guidance systems upon which the individual and MIRVed warhead delivery systems depend.

Events would not even have to be as miraculous as I have described in order to limit World War III. There is serious concern on the part of the military that they will not even be able to fight the war because of such factors as the EMP. However, I have faith in the military. I am sure they will do an admirable job of trying to destroy the world.

None of us have an infallible insight into the future or its timetable. Whatever will be, will be. We can but wait upon events to prove our speculations to be right or wrong. While we are working and waiting some of us put our trust in God. Others put it in the Government.

MYTH #21: You will receive adequate warning from your government.

The government at first proposed the individual family shelter plan. Then it abandoned it. Next it proposed the community shelter plan. Then it abandoned it. Then it proposed the relocation plan. Then it abandoned it. Presently it has no plan. Don't you feel abandoned?

The government has millions to spend for destruction but not a penny for defense. The EMO (Emergency Measures Organization) has been completely shut down. The Ontario government was allocated three berths in the Radiological Defense Officers course (for the summer of 1982) given by the Canadian Emergency Measures College at the Emergency Planning Canada Federal Study Center in Arnprior, Ontario, but it didn't feel it could afford to send anyone even after our group offered to pay expenses for three people. We appealed all the way up to the Solicitor General's office.

Admittedly, I am authorized to teach the course but during the last course that I taught at one of the community colleges (free gratis) I could not even get any resource personnel to come from Camp Borden, who are responsible for administering the examinations. I feel abandoned. A radiological detection kit that I used to be able to get for sixty dollars, in the US, now costs in Canada, with import duties (they really want you to have one), federal and provincial taxes, exchange rate, custom's brokerage, and you name it, \$450. Who cares?

The last Radiological Scientific Officers Course taught in Canada was in 1977. No future courses are planned. There are no communities with a nuclear defense plan. I think I can make that an unqualified statement.

Millions for destruction and not a penny for defense. Your family's destruction bill for this year is \$1,300 per member of your family. Do you realize what \$1,000 a year for the last ten years would have bought you in the way of nuclear survival defense? Instead, your government has bought you destruction. Your family's destruction.

Oh, I am well aware of the argument that that pile of bombs has maintained peace in the world for the last ten years, and the belief that it will continue to maintain peace. Believe it if you want to. All the high government officials have their shelters. Why do they need them if you don't?

If the government knew today that the Russians were going to attack next week, do you think they would tell you? If they did, what would you and the millions like you do? It would only create panic and get in their way. No, I do not think that you would be told. Do you feel abandoned?

MYTH #22: You will receive no warning, and there is no hope if you do.

The fact the government may not warn you, and is not giving you any assistance to defend yourself does not mean that you haven't been warned. There are many people who feel they can see the *signs of the times*. Anyway, if you have read this document, consider yourself warned. You may still have time to prepare. If an attack should occur you probably do not live in a primary target area and will have plenty of time to escape. If you have made preparation.

MYTH #23: One of the primary targets will be nuclear power plants.

Many persons come up with all sorts of rationalizations as to why they should not prepare for survival. One is that there is a sufficient number of weapons in the world, that if they were all used, they could destroy the whole of mankind. This is true.

However, it may be that all the weapons will not be used. Some may be destroyed by the other side. Some may misfire. Others may just fail to get launched. This is why each side has so many extra. Moreover, many persons make the mistake of assuming that it is all in man's hands and determined by man's will. Whatever. It may be that some limited amount of the potential for destruction will be used.

Another rationalization often heard is that the person feels they live in a target area such as in the vicinity of a nuclear generating plant. In actuality the Russians have little need to target the nuclear generating plants and probably can do more damage by not doing so. A bomb on the plant would just blow it to smithereens and the material in the plant might add little to the radioactive fallout. On the other hand, as a result of the EMP, if the plant is left on its own when it loses its computer control it will go into a meltdown and add substantial radioactive material to the atmosphere.

All of this is quite speculative, of course. There are no experts on nuclear war. There is no one living who has been through one. There is general agreement that it will be awfully terrible. It will probably take six or seven months just to bury the bodies. But, there will probably be someone around to it.

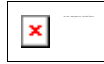
Useful Figures and Tables



This was the fallout pattern 36 hours after a single 15-megaton thermonuclear device (the Bravo shot of Operation Castle at Bikini Atoll - March 1, 1954) was detonated. The eventual extension of the fallout was more than 20 miles upwind and over 320 miles downwind. The width in cross section was variable, the maximum being over 60 miles. This means there was substantial fallout contamination over an area of more than 7000 square miles.

It is important to note that persons anywhere downwind would not have had to travel more than 40 miles in a direction crosswind to be perfectly safe. Secondly, assuming upperwinds of 150 miles per hour and descent times of 30 minutes, persons 150 to 200 miles away would have over an hour in which to either evacuate the area or to take shelter.

As noted from the chart on [the effects of radiation on humans](#), the 300 roentgens per hour would cause serious illness with some fatalities after an exposure of 1 hour and exposure of 2 hours would certainly cause a hard death occurring in hours to days.



This picture shows the effect of a 5-megaton airblast. While much larger weapons have been developed experimentally their use is unlikely. For one thing they are hard to deliver and, more importantly, with a 20-megaton weapon we do only about one third the damage that will be caused by 4 five-megaton weapons. 5 to 8 megatons will probably be the average size of the strategic weapons. They will probably be detonated at some altitude around 2000 feet for maximum effect. At 15 to 18 miles on a clear day exposed people will be blistered, and from 18 to 23 miles they will be sunburned.

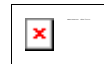


This map shows the principal targets in the US. Major airports, military installations, and railway passes would be targets in Canada. The number two target in North America is North Bay, Ontario.

In an all out nuclear exchange (WW III), with a multiplicity of devices being detonated over a relative short period of time (three days to two weeks is a common estimate), there would most likely be wide spread areas with general radiation levels (in the 5 to 20 roentgen per hour range) over 1000 miles down wind from the blast sites, two to three days after zero hour.



This map indicates the amount of radiation that a person would receive in various areas by remaining in the open for 14 days following the bombing of targets indicated in the map above. It is important to note from the map that even if Canada were not bombed that Ontario would receive 101 to 450 roentgens from the MinuteMan sites in Montana and the Dakotas.



The effect of a mere 10 roentgens per hour (arriving two or three days after a detonation and thus having already lost much of its rapid decay) would cause serious illness after one day's exposure, and (even with continued decay) would cause certain death within a couple of weeks. However, almost any expedient shelter would greatly minimize the effects.

The basement shelter shown here could mean the difference between life and death. As much care as possible should be taken to make sure the shelter roof is below outside ground level. Otherwise, radiation will come in at an angle through the narrow basement wall, as demonstrated.

Seven/Ten Rule

1 hour	-----	1000	roentgens/hour
7 hours	-----	100	roentgens/hour
49 hours (2 days)	-----	10	roentgens/hour

2 weeks ----- 1 roentgens/hour
 14 weeks ----- 0.1 roentgens/hour
 98 weeks (2 1/2 years) --- 0.01 roentgens/hour

This chart indicates that if one started off with one thousand roentgens of radiation per hour at zero plus 1 hour, that it would take 2 weeks for the radiation to get down to 1 roentgen per hour.

Since death would be almost certain after exposure for even 1/2 hr (see accompanying chart) it is apparent that shelter would be necessary.

The important thing to remember about the seven/ten rule is that it is only theoretical, and that actual decay may follow a different slope. Secondly, in order to use it, one must know the exact time of detonation for the weapon causing the fallout. And thirdly, it is only applicable for calculating the fallout from one weapon, and not for multiple sources.



The above is a model of the underground shelter built 50 miles north of Toronto. It is not nearly so elaborate as some in the US. It is like a lifeboat compared to the Queen Mary. Still, each family would have their private compartment, which would be suitable shelter for several weeks.

Examples of the Effects of Radiation on Humans

Roentgens per hour	Duration of exposure	Total dosage of radiation received	Number that will die	Deaths will occur in
-----	-----	-----	-----	-----
5-10	2- 5 hours	10- 50R	none	
50	1- 4 hours	50- 200R	less than 5%	60 or more days
100	2- 4 hours	200- 400R	less than 50%	30 to 60 days
100	4- 6 hours	400- 600R	more than 50%	about one month
100	6-10 hours	600-1000R	all	less than two weeks
200 plus	3 hours plus	600R plus	all	the more intense the radiation the shorter the time before death
1.0	1 week	150R	none	
0.3	1 month	200R	none	

0.1	4 months	300R	none	
1.5	1 week	250R	5%	3 months
0.5	1 month	350R	5%	6 months
0.2	4 months	500R	5%	9-18 months
2.7	1 week	450R	50%	1-3 months
0.8	1 month	600R	50%	2-6 months

Example of the Effect of Shielding



Any material can be used for shielding against radiation. Even feathers. There is nothing magical about lead. It is only the density of the material that matters. A pound of lead and a pound of feathers weigh exactly the same. But it takes a much bigger stack of feathers than it does of lead to make a pound.

Neither feathers nor lead are generally particularly cheap to obtain, so it is usually better to use some other material like dirt or concrete. The more dirt or concrete in the barrier, the greater the protection. Since concrete is more dense (heavier) it only takes about 24 inches of concrete to give the same protection as 36 inches of dirt.

Thirty-six inches (three feet) of dirt will give good protection. Five feet of dirt will give better.

Nuclear Survival Groups

There are probably 12 nuclear survival groups in the city of Toronto. I personally know of four and I have heard of three or four others. (There may be some overlap. I can't be certain.) My guess is that there are another three or four I don't know about. Most such groups are very secretive, for various reasons. Three of the groups are headed up by instructors, like myself, who teach survival courses at the community colleges.

Most of the groups contain a number of very well trained and experienced people. There are also many other groups scattered around both the US and Canada. They have their own training bases and survival courses. There is a magazine, *Survive*, where you can learn about some of these groups.

What is Radiological Defense Officer?

Both in the Canada and the United States the Federal Governments have trained certain individuals to be advisors to mayors and other public officials in time of nuclear disaster. In Canada these individuals are called Radiological Defense Officers.

Certain Radiological Defense Officers have received additional training, so as to become qualified to teach Radiological Defense Officers. These individuals are designated as being Radiological Scientific Officers. The supposed requirement for becoming a Radiological Defense Officer is a

Ph.D. in physics, but because of a lack of candidates, individuals with lesser qualifications have been selected.

About the Author

The main author of this document built twenty-three fallout shelters in Kansas and Utah in the 1960's. He completed the US Office of Civil Defense course in 1970 after moving to Canada and then the Radiological Defense Officer's course at Arnprior, Ontario in 1976, and the Radiological Scientific Officer's course in 1977.

While in the USAF, he was a control tower operator and graduated as Honor Student from the AACCS supply school. Because of this training he was asked to inspect the Titan missile sites after his honorable discharge. He refused because of his understanding of what the missiles could do to mankind. He has been a member of various anti-war groups and his personal motto is "Bell the Cat and Ban the Bomb", but he thinks it is now too late to do either.

His master's degree is in Economics from Texas Christian University, and he holds certificates in both data processing and information technology, the latter from MIT.

Prior to becoming a college teacher of computer science he was a telephony engineer and holds both US and Canadian patents.

He presently devotes a large amount of his time to the nuclear survival group mentioned in this document.

Bibliography

The two books that I most highly recommend are:

- [Life After Doomsday](#) by *Dr. Bruce D. Clayton*; click on the title of this book to order it from [Amazon.com](#).
- [Nuclear War Survival Skills](#) by *Cresson H. Kearny*; click on the title of this book to order it from [Amazon.com](#).

