Chapter 13
Surviving Without Doctors

A TEMPORARY RETURN TO SELF-HELP

Most doctors, hospital facilities, and medical supplies are located in cities. An all-out attack would destroy most of these modern blessings. Even if medical assistance were nearby, only a few of the survivors confined to shelters in areas of heavy fallout would be able to get needed medicines or the help of a doctor. For periods ranging from days to months, most unprepared survivors would be forced to live under medical conditions almost as primitive as those experienced by the majority of mankind for all but the past few decades of human history.

BENIGN NEGLECT

Life without modern medical help would be less painful and hazardous for those survivors who have some practical knowledge of what should be done—or not done—under primitive, unsanitary conditions. Information about first aid and hygienic precautions can be obtained from widely available Red Cross and civil defense booklets and courses. This knowledge, with a stock of basic first aid supplies, would reduce suffering and prevent many dangerous illnesses. However, first aid instructions do not include advice about what to do for serious injuries and sicknesses if no doctors or effective medicines are available.

Where There Is No Doctor,[32] the excellent self-help handbook recommended by Volunteers in Technical Assistance, gives much information that goes far beyond the scope of first aid. But even this handbook repeatedly recommends getting professional medical help whenever possible for serious injuries and illnesses.

Fortunately, the human body has remarkable capabilities for healing itself, especially if the injured or sick person and his companions practice intelligent "benign neglect." Such purposeful non-interference with the body's recuperative processes was called "masterful inactivity" by Colonel C. Blanchard Henry, M.D., a widely recognized authority on mass casualty evacuation and treatment. Colonel Henry was one of the first medical officers to visit Hiroshima and Nagasaki after their destruction and was an experienced analyzer of civil defense preparations in several countries.

The following is a brief summary of Colonel Henry's medical advice for nuclear war survivors living under primitive conditions and unable to get the help of a doctor or effective medicines.[33] (Additional advice, enclosed in brackets, is from a medical publication.[34])

- **Wounds:** Apply only pressure dressings to stop bleeding—unless an artery has been cut, as by a blast-hurled piece of glass. If blood is spurting from a wound, apply both a pressure dressing and a windlass-type tourniquet. Release the tourniquet pressure about every 15 minutes, to allow enough blood to reach the flesh beyond the tourniquet and keep it alive. There is a fair chance that clotting under the pressure dressing will stop blood loss before it becomes fatal.

- **Infected wounds:** Do not change dressings frequently. The formation of white pus shows that white corpuscles are mobilizing to combat the infection. In World War I, wounded soldiers in hospitals suffered agonies having their wounds cleaned and dressed frequently; many died as a result of such harmful care. In contrast, before antibiotics became available late in World War II, casts and dressings on infected wounds sometimes were not changed for weeks. (The author saw this treatment in China and India and smelled the stench resulting

from such "benign neglect" of American soldiers' wounds—neglect that helped save limbs and lives.)

- **Pieces of glass deeply embedded in flesh:** Do not probe with tweezers or a knife in an attempt to extract them. Most glass will come out when the wounds discharge pus.

- **Burns:** Do not apply grease, oil or any other medicine to the burned area. Cover the area securely with a clean, dry dressing or folded cloth. Do not change the dressing frequently. [For most burns, the bandage need not be removed until the tenth to fourteenth day. Give plenty of slightly salted water: about 1 teaspoon (4.5 gm) of salt per quart (or liter), preferably chilled, in amounts of 1 to 3 liters daily.[34]]

- **Broken bones:** Apply simple splints to keep the bones from moving. Do not worry about deformities; most can be corrected later by a doctor. Do not attempt traction setting of broken bones.

- **Shock:** Keep the victim warm. Place blankets or other insulation material under him. Do not cover him with so many blankets that he sweats and suffers harmful fluid losses. Give him plenty of slightly salted water [about a teaspoon of salt in a liter (or quart) of water].

- **Heat prostration:** Give adequate fluids, including slightly salty water.

- **Simple childbirth:** Keep hands off. Wait until the mother has given birth. Do not tie and cut the cord unless a potent disinfectant is available. Instead, use the primitive practice of wrapping the cord and the placenta around the infant until they dry. Avoid the risk of infecting the mother by removing the rest of the afterbirth; urge the mother to work to expel it.

- **Toothache:** Do not attempt to pull an aching tooth. Decaying teeth will abscess and fall out. This is a painful but seldom fatal process—one which was endured by most of our remote ancestors who reached maturity.

VETERINARIAN ANTIBIOTICS

People who for decades have used antibiotics to combat their infections have not produced normal quantities of antibodies, and have subnormal resistance to many infections. People who have not been dependent on antibiotics have these antibodies. In the aftermath of a massive nuclear attack, most surviving Americans would be in rural areas; many would need antibiotics. A large part of their need could be met by the supplies of veterinarian antibiotics kept on livestock and chicken farms, at feed mills, and in small towns. Many animals are given more antibiotics in their short lives than most Americans receive in theirs. Hogs, for example, are given antibiotics and/or other disease-controlling medicines in their feed each day. In many farming areas, veterinary antibiotics and other medicines are in larger supply than are those for people. Realistic preparations to survive an all-out attack should include utilizing these supplies.

RADIATION SICKNESS

For the vast majority of Americans who would receive radiation doses from a massive attack, the help of doctors, antibiotics, blood transfusions, etc., would not be of life-or-death importance. Very few of those receiving acute doses (received within 24 hours) of less than 100 R would become sick, even briefly. All of those exposed to acute doses between 100 R and 200 R should recover.[6] If total doses this size or even several times larger are received over a period of a few months in small doses of around 6 R per day, no incapacitating symptoms should result. The human body usually can repair almost all radiation damage if the daily doses are not too large.

The majority of those with acute doses of less than about 350 R will recover without medical treatment. Almost all of those receiving acute doses of over 600 R would die within a few weeks, even if they were to receive the complex hospital treatments given to the very rare peacetime victims of large radiation doses. If all doctors and the equipment and drugs needed for such heroic treatments magically were to survive an attack—and persons suffering from radiation sickness could reach them—relatively few additional lives could be saved.

The most effective way to reduce losses of health and life from radiation sickness is to prevent excessive exposure to radiation. Adequate shelter and essential life-support items are the best means of saving lives in a nuclear war. The following information on radiation sickness is given to help the reader understand the importance of building a good shelter and to help him distinguish between symptoms of common illnesses and first symptoms of radiation sickness.

The first symptoms of radiation sickness are nausea, vomiting, headache, dizziness, and a general

feeling of illness.[6] These symptoms begin several hours after exposure to acute doses of 100 R to 200 R, and within 30 minutes or less after receiving a fatal dose. A source of probable confusion is the fact that one or more of these symptoms is experienced by many people when they are first exposed to great danger, as in an air raid shelter during a conventional bombardment.

The occupants of a shelter might worry unnecessarily for weeks, mistaking their early emotional reactions for the initial phase of radiation sickness. This would be particularly true if they had no dependable instrument for measuring radiation, or if none of them knew how to use such an instrument.

The initial symptoms end within a day or two. Then follows the latent phase of radiation sickness, during which the patient experiences few, if any, symptoms. If the dose received was in the non-fatal range, the latent phase may last as long as 2 weeks.

In the final phase, the victim of serious or fatal radiation sickness will have reduced resistance to infections and is likely to suffer diarrhea, loss of hair, and small hemorrhages of the skin, mouth, and/or intestinal tract. Diarrhea from common causes may be confused with the onset of radiation sickness, but hemorrhages and loss of much hair are clear indications of having received serious, but not necessarily fatal, radiation exposure. The final phase usually lasts for one to two months. Any available antibiotics should be reserved for this critical phase of the illness.

Doses of 1000 R to 5000 R result in bloody diarrhea, fever, and blood circulation abnormalities, with the initial symptoms beginning within less than 30 minutes after exposure and the final phase occurring less than a day thereafter. Death results within 2 to 14 days. The victim of a dose of over 5000 R dies a hard death within 48 hours, due to radiation damage to the central nervous system.

Recovery from most cases of radiation sickness will be more likely for patients who receive a well balanced diet, rest, freedom from stress, and clean surroundings. But most patients, even without these advantages, will survive—as proved by the survival of thousands of Hiroshima and Nagasaki citizens who suffered serious radiation sickness. Nursing radiation victims is not hazardous. Even persons dying from a dose of 5000 R are not sources of dangerous radiation by wartime standards, and radiation sickness is not contagious.

LIFETIME RISKS FROM RADIATION

The large radiation doses that many survivors of a nuclear attack would receive would result in serious long-term risks of death from cancer. But neither the lifetime risks from large wartime nor small peacetime radiation doses are as bad as many people believe. The risk estimates of reputable scientists vary widely. Joseph Califano, Secretary of the U.S. Department of Health, Education, and Welfare, gave testimony on April 4, 1979 that reflects an average of the reputable estimates. During an investigation of the Three Mile Island nuclear accident, Mr. Califano stated a "reasonable guess": if 10,000 people (a typical mixture of sexes and ages) are exposed to 1000 millirem (1 rem) of radiation, one additional fatal cancer will result.[35] (The "rem" is an abbreviation for "roentgen equivalent (in) man."[6] The rem takes into account the biological effects of different kinds of radiation. For external gamma-ray radiation from fallout, the numerical value of an exposure or dose given in roentgens is approximately the same as the numerical value given in rems or in rads, another unit in which radiation doses are given. Therefore, for simplicity's sake, this book gives both instrument readings (exposures) and doses in roentgens (R).)

This risk estimate can be applied to large wartime radiation doses from fallout: If 100 people each received a dose of 100 R (or 100 rem, or 100 rads), over a lifetime period it is probable that there would be *one more death* resulting from cancer than if these same people had not received this radiation dose.

The reader desiring good information on the long-term and worldwide effects of radiation is referred to two authoritative reports of the National Academy of Sciences, Washington, D.C. 20006: *The Effects on Populations of Exposures to Low Levels of Ionizing Radiation* (The BEIR Report made by the NAS Committee on the Biological Effects of Ionizing Radiation) (November 1972); and *Long-Term Worldwide Effects of Multiple Nuclear-Weapons Detonations* (1975).

From the standpoint of basic survival know-how, these and other complicated scientific studies show that after a nuclear attack people should:

* Provide the best protection against radiation for pregnant women and young children, since

fetuses and the very young are the most likely to be hurt by radiation.

* Persuade older people to do more of the essential work that necessitates receiving large radiation doses. A 65-year-old is less susceptible to radiation than a 20-year-old, and the older person probably will not live long enough to die of a cancer that takes 20 years or more to develop.

PREVENTION OF THYROID DAMAGE FROM RADIOACTIVE IODINES

There is no medicine that will effectively prevent nuclear radiations from damaging the human body cells that they strike. However, a salt of the elements potassium and iodine, taken orally even in very small quantities ½ hour to 1 day before radioactive iodines are swallowed or inhaled, prevents about 99% of the damage to the thyroid gland that otherwise would result. The thyroid gland readily absorbs both non-radioactive and radioactive iodine, and normally it retains much of this element in either or both forms. When ordinary, non-radioactive iodine is made available in the blood for absorption by the thyroid gland before any radioactive iodine is made available, the gland will absorb and retain so much that it becomes saturated with non-radioactive iodine. When saturated, the thyroid can absorb only about 1% as much additional iodine, including radioactive forms that later may become available in the blood; then it is said to be blocked. (Excess iodine in the blood is rapidly eliminated by the action of the kidneys.)

An excess of ordinary iodine retained in the thyroid gland is harmless, but quite small amounts of radioactive iodine retained in the thyroid eventually will give such a large radiation dose to thyroid cells that abnormalities are likely to result. These would include loss of thyroid function, nodules in the thyroid, or thyroid cancer. Sixty-four Marshall Islanders on Rongelap Atoll were accidentally exposed to radioactive fallout produced by a large H-bomb test explosion on Bikini Atoll, about 100 miles away. Twenty-two of them developed thyroid abnormalities beginning nine years later.[6] In the two days before they were taken out of the fallout area, these completely uninformed natives, living essentially outdoors, had received estimated whole-body gamma-ray doses of about 175 R from the fallout all around them. They absorbed most of the radioactive iodine retained by their thyroid glands as a result of eating and drinking fallout-contaminated food and water during their two days of exposure. (Because of unusual environmental conditions at the time of fallout deposition, some of the retained radioactive iodine may have come from the air they breathed.)

An extremely small and inexpensive daily dose of the preferred non-radioactive potassium salt, potassium iodide (KI), if taken ½ hour to 1 day before exposure to radioactive iodine, will reduce later absorption of radioactive iodine by the thyroid to only about 1% of what the absorption would be without this preventive measure. Extensive experimentation and study have led to the Federal Drug Administration's approval of 130-milligram (130-mg) tablets for this preventive (prophylactic) use only.[36,37] A 130-mg dose provides the same daily amount of iodine as does each tablet that English authorities for years have placed in the hands of the police near nuclear power plants, for distribution to the surrounding population in the very unlikely event of a major nuclear accident. It is quite likely that a similar-sized dose is in the Russian "individual, standard first-aid packet." According to a comprehensive Soviet 1969 civil defense handbook,[38] this first-aid packet contains "anti-radiation tablets and anti-vomiting tablets (potassium iodide and etaperain)."

• Prophylactic use of potassium iodide in peacetime nuclear accidents.

In March 1979 no 130-mg potassium iodide tablets were available in the United States. Therefore, when the 1979 accident that killed no one occurred at the Three Mile Island nuclear plant in Pennsylvania, 259,000 small bottles of a saturated aqueous solution of potassium iodide were produced and rushed to the vicinity of the accident. An equal number of medicine droppers also was supplied.[39] It was not necessary to distribute this prophylactic medicine, however, because the plant's containment system prevented the discharge of hazardous quantities of radioactive iodine.

The following information and warnings concerning the use of potassium iodide were prepared by the U.S. Food and Drug Administration. This official advice would have been distributed along with small bottles of potassium iodide solution if the 1979 accident at the Three Mile Island nuclear plant had resulted in dangerous discharges of radioactive iodine.

PATIENT INFORMATION USE OF SATURATED SOLUTION OF POTASSIUM IODIDE (SSKI) FOR THYROID BLOCKING

Directions for Use: See label on bottle

Background: This product is available solely for public health protection in the event of a nuclear accident which releases into the environment radioactive iodine which may be inhaled or swallowed. Use of potassium iodide as directed reduces the accumulation of radioactive iodine in the thyroid gland. This is important because radiation may damage the cells of the thyroid gland in such a way that changes in the function or structure of the gland may occur even many years after exposure. You should take this product as soon as possible after being told to do so by your public health authority. While the length of time you will take this product will depend upon the directions from your public health authority, it is not expected to exceed about 10 days unless specifically directed otherwise.

Facts about Potassium Iodide: Potassium iodide has been used for many years in large doses (2 to 10 times the dose recommended here) to treat persons with asthma and other lung conditions. It is a relatively safe drug when taken as directed, but as with any drug, side effects may occur. Although side effects are unlikely because of the low dose and the short time you will be taking the drug, they are listed in this insert along with advice on what to do if they occur. It is important to emphasize that *larger doses are not necessary* for the drug to work properly. The larger the dose, the greater the risk of side effects; *therefore, do not exceed the recommended dose.*

Who Can Take Potassium Iodide? Unless you are *allergic* to iodide, you may take potassium iodide as directed. Even if you are taking a thyroid hormone drug product for an underactive thyroid gland, or taking an antithyroid drug for an overactive thyroid gland, you may still take potassium iodide. Pregnant women may also take it.

Side Effects: In general, the side effects of potassium iodide have been seen when higher doses of potassium iodide have been taken for a long time. You should be especially cautious not to exceed the recommended dose or take potassium iodide longer than instructed. There are two kinds of side effects: those not involving the thyroid gland and those involving the thyroid gland.

Side effects not involving the thyroid gland. The taking of iodide has been associated with skin rashes, swelling of the salivary glands ("iodide mumps"), and iodism (metallic taste, burning in the mouth and throat, soreness of the teeth and gums, skin rashes, symptoms of a head cold, and sometimes a gastric upset and diarrhea). Also, allergic reactions may produce symptoms such as fever and pains in the joints or, on rare occasions, swelling of various parts of the face and body with at times severe shortness of breath requiring immediate medical attention.

Side effects involving the thyroid gland: The taking of iodide has been associated with overactivity of the thyroid gland, underactivity of the thyroid gland, and enlargement of the thyroid gland (goiter). Goiter may occur also in infants born to mothers who took large doses of potassium iodide throughout pregnancy.

What To Do If Side Effects Occur:

For side effects not involving the thyroid gland: If any of these side effects occur, call your physician or public health authority for instructions. If the symptoms are minor, you may be advised to continue taking potassium iodide. If you have an allergic reaction, discontinue taking potassium iodide and seek immediate medical attention.

For side effects involving the thyroid gland: Because these side effects are very unlikely, with short term use, they pose no immediate problem. However, the taking of iodide has been associated with overactivity of the thyroid gland in elderly persons with heart disease. The symptoms of an overactive thyroid gland are very similar to those associated with anxiety and include nervousness, sweating, and rapid heartbeat. Because in an emergency some anxiety is likely, it is difficult to determine whether these symptoms are caused by anxiety or an overactive thyroid gland. An overactive thyroid, however, would only occur after you had taken potassium iodide for several days. Thus, if these symptoms are persistent and severe, and particularly if the heartbeat is not only rapid but irregular, you should call your physician or public health authority because medical attention is probably required.

If you do not have any potassium iodide, do not try to use tincture of iodine as a blocking agent. Elemental (free) iodine is ineffective as a blocking agent and is poisonous if taken in much larger quantities than the very small amounts consumed when you drink water that has been disinfected with iodine. Also you should not make a futile, harmful attempt to eat enough iodized salt to result in thyroid blocking.

- **For protection against radioactive iodine in fallout from a nuclear war fought outside the United States.**

Most strategists believe that a nuclear war fought by nations other than the United States is a more likely catastrophe than a nuclear attack on America. Several of the Soviet and Chinese nuclear test explosions have resulted in very light fallout deposition and some contamination of milk by radioactive iodine in many of the 50 states. However, serious contamination of milk, fruits, and vegetables could result if war fallout from many nuclear

explosions were to be carried across the Pacific by the prevailing westerly winds. **The measured contamination of milk from a few cows in the United States indicates that protective measures would be taken.** The worst-contaminated milk produced in Tennessee and tested at Oak Ridge National Laboratory was from a cow that had grazed on a pasture near the laboratory onto which fallout from the Chinese test explosion of December 28, 1966 had been deposited.[40] Deposition of this fallout began in Tennessee on January 1, 1967. This cow's milk contained more radioactive iodine than is specified by the Food and Drug Administration's very conservative "Response level for Emergency PAG" (Protective Action Guide) as warranting protective action.[37] "An Emergency PAG establishes a level at which responsible officials should isolate food containing radioactivity to prevent its introduction into commerce, . . ."[37]

If a nuclear war were to be fought in northern parts of Asia, or in Europe, or in the Middle East, a very small fraction of the fallout would come to earth on parts or all of the United States.[40] This fallout would not result in an overwhelming catastrophe to Americans, although the long-term health hazards would be serious by peacetime standards and the economic losses would be great.[40] The dangers from radioactive iodine in milk produced by cows that ate fallout-contaminated feeds or drank fallout-contaminated water would be minimized if Americans did not consume dairy products for several weeks after the arrival of war fallout. Safe milk and other baby foods would be the only essential foods that soon would be in very short supply. The parents of babies and young children who had stored potassium iodide would be especially thankful they had made this very inexpensive preparation, that can give 99%-effective protection to the thyroid. All members of families with a supply of potassium iodide could safely eat a normal diet long before those without it could do so.

The most dangerous type of radioactive iodine decays rapidly. At the end of each 8-day period it gives off only half as much radiation as at the start of that period. So at the end of 80 days it emits only about 1/1000 as much radiation per hour as at the beginning of these 80 days. Because of this rapid decay, a 100-day supply of potassium iodide should be sufficient if a nuclear war, either overseas or within the United States, were to last no more than a week or two.

The probability of most Americans being supplied with prophylactic potassium iodide during a major nuclear disaster appears low. Under present regulations the decision concerning whether to stockpile and dispense potassium iodide tablets rests solely with each state's governor.[41]

- **Use for thyroid protection after a nuclear attack on the United States.**

After a nuclear attack, very few of the survivors would be able to obtain potassium iodide or to get advice about when to start taking it or stop taking it. In areas of heavy fallout, some survivors without potassium iodide would receive radiation doses large enough to destroy thyroid function before modern medical treatments would again become available. Even those injuries to the thyroid that result in its complete failure to function cause few deaths in normal times, but under post-attack conditions thyroid damage would be much more hazardous.

- **Ways to obtain potassium iodide for prophylactic use.**

* *By prescription today.* With a prescription from a doctor, a U.S.P. saturated solution of potassium iodide can be bought at most pharmacies today. (In a crisis, the present local supplies would be entirely inadequate.) The saturated solution contains a very small amount of a compound that prevents it from deteriorating significantly for a few years. It is best stored in a dark glass bottle with a solid, nonmetallic cap that screws on liquid-tight. A separate medicine dropper should be kept in the same place. An authoritative publication[36] of the National Committee on Radiation Protection and Measurements states: "Supplies of potassium iodide can be stored in a variety of places, including homes, . . ."

In April of 1979, a 2-ounce bottle, containing about 2,000 drops of this 99-percent-effective prophylactic solution, sold for $2.35 in an economy drug store. This is enough for 500 daily doses—at a cost of less than half a cent per dose.

* *Possibly without prescription in future years.* If 130-mg potassium iodide tablets are produced in the United States and if they are made available in pharmacies, they will be sold over-the-counter and the buyer will receive accompanying written instructions for their prophylactic use.[37]

* *From chemical supply firms.* Chemical reagent grade potassium iodide is purer than the pharmaceutical grade. Individuals can buy it from some chemical supply firms; no prescription or other authorization is necessary. In 1979, one pound of the chemical reagent grade—enough for approximately 3,500 doses of 130 mg each—retailed for around $20. (Years ago the author bought a pound, enough for family and friends.)

For years of storage, crystalline or granular potassium iodide is better than a saturated solution. These dry forms are sold by prescription in some pharmacies. Dry potassium iodide should be stored in a dark bottle with a gasketed, non-metallic cap that screws on tightly. Two-fluid-ounce bottles, filled with dry potassium iodide as described below, are good sizes for a family. Separate medicine droppers should be kept with stored bottles.

- **Practical expedient ways to prepare and take daily prophylactic doses of a saturated solution of potassium iodide.**

To prepare a saturated solution of potassium iodide, fill a bottle about 60% full of crystalline or granular potassium iodide. (A 2-fluid-ounce bottle, made of dark glass and having a solid, non-metallic, screwcap top, is a good size for a family. About 2 ounces of crystalline or granular potassium iodide is needed to fill a 2-fluid-ounce bottle about 60% full.) Next, pour safe, room-temperature water into the bottle until it is about 90% full. Then close the bottle tightly and shake it vigorously for at least 2 minutes. Some of the solid potassium iodide should remain permanently undissolved at the bottom of the bottle; this is proof that the solution is saturated.

Experiments with a variety of ordinary household medicine droppers determined that 1 drop of a saturated solution of potassium iodide contains from 28 to 36 mg of potassium iodide. The recommended expedient daily doses of a saturated solution (approximately 130 mg for adults and children, and 65 mg for infants) are as follows:

* For adults and children, 4 drops per day of a saturated solution of potassium iodide.

* For infants less than 12 months old, 2 drops per day of a saturated solution of potassium iodide.

Potassium iodide has a very bad taste, so bad that a single crystal or 1 drop of the saturated solution in a small child's mouth would make him cry. Since many persons will not take a bad-tasting medication, especially if no short-term health hazards are likely to result from not taking it, the following two methods of taking a saturated solution are recommended:

* Put 4 drops of the solution into a glass of milk or other beverage, stir, and drink quickly. Then drink some of the beverage with nothing added. If only water is available, use it in the same manner.

* If bread is available, place 4 drops of the solution on a small piece of it; dampen and mold it into a firm ball the size of a large pea, about $^3/_8$ inch in diameter.There is almost no taste if this "pill" is swallowed quickly with water. (If the pill is coated with margarine, there is no taste.)

As stated before, 4 drops of the saturated solution provide a dose approximately equal to 130 mg of potassium iodide.