THE MIGHTY

Speaking to the American Society of Newspaper Editors recently, Federal Civil Defense Administrator Caldwell cited 4 reasons why these are the the gravest days in our history.

1. The Russians have atomic bombs and planes in sufficient numbers and excellent to assault ALL of our major cities in one attack.
2. There is little or nothing we can do to stop them. The best to be expected is that some 10 percent of the attacking farce may be downed or deflected.
3. That attack can come with little or no warning. The best we can hope for is a few minutes notice.
4. The Russians are capable and ready to deliver this destruction whenever they feel like it -- whenever it is most profitable to do so.

Millard F. Caldwell, former Governor of Florida, Administrator of Federal Civil Defense.

A POTENTIAL MILITARY WEAPON

We are currently engaged in a conflict in which use of the atomic bomb is quite probable. It is highly important that you understand the effects of this weapon and how you can best protect yourself. We shall present in the following pages a simple digest of such facts from governmental and other authentic sources we feel to be of greatest value.

The atomic bomb is an extremely potent military weapon but not "absolute" in the sense that its possession alone guarantees victory. Thus far the United States has exploded several atom bombs and we have learned of the devastation that can be caused. In Hiroshima, 71,000 people were killed and 68,000 injured in a city of 245,000. About 75 A-bombs, according to Dr. R. E. Lapp, would probably have done as much damage to target areas in Germany as was done by all the strategic bombing during World War II. With all its tremendous heat and blast effects, accompanied by its unique radiation effects, it is still not unlimited in the amount of damage it can do. You need not worry, for example, about rumors to the effect that atomic explosions might contaminate the earth. It would take something like a million A-bombs to do the trick.

The atomic bomb is certainly to be feared and respected but there is no reason that it should cause panic. Now that the damage that it can cause, and the probable extent of such damage, is known, it has been possible to formulate certain simple rules that will go a long way towards insuring your safety and eliminate to a great degree the element of fear.

In any discussion of the atomic weapon it should be remembered that constant improvements in design and type, or useage, can be expected. A top military spokesman recently forecast the use of A-bombs as the next probable step in battlefield warfare and said that they can be used with deadly accuracy against troops, tanks and other military targets.

RADIOLOGICAL WARFARE — The use of radioactive gases, dusts or mists as a weapon, is a possibility and we should be prepared for it according to Prof. Ridenour of the University of Illinois. The primary purpose of such warfare would be disruption of community and industrial life.

H-BOMB (Hydrogen Bomb) . . . It is no secret that research and experimentation on the development of the H-bomb is going on. It is not possible to predict when, or if, such a weapon will be produced. According to N. Y. State Civil Defense Commission, a Hydrogen bomb of 1000 X nominal bomb power would have a radius of total devastation of 10 miles. The Hiroshima bomb severely devastated 4.5 sq. miles, moderate to heavy damage within 9 sq. mi. area. 1000 X hydrogen bomb would totally devastate an area of 314 sq. miles.

ATOMIC GUIDED MISSILES — President Truman recently announced that we have developed fantastic new weapons.

In testimony before the senate appropriations committee Gordon Dean, Chairman of the Atomic Energy Commission, disclosed the U. S. will have atomic guided missiles "and things of that type" in 1952. In a speech in Los Angeles Dean said, "We have today a tactical (atomic bomb) capability which is very impressive. . . . It can be used against men in the field and against military targets."

ATOM BOMB!

THE ATOMIC BOMB differs from other bombs in several important ways: (1) **ENERGY** released by an atomic bomb is roughly equivalent to that produced by the explosion of 20,000 tons of TNT bombs; (2) the explosion of the bomb produces highly penetrating, invisible **RADIATION** in the form of lethal gamma rays. In addition there is also; (3) intense **HEAT** (1,000,000° C. in center of fireball) and **LIGHT** (at 5.7 miles, the brilliance is 100 times that of the sun viewed at the earth's surface); and (4) **RADIOACTIVE RESIDUES** which remain after the explosion emitting harmful radiations.

TYPES OF EXPLOSIONS

UNDERWATER BLAST— In test "Baker" off Bikini, a tremendous column of water was produced, which completely absorbed the initial flash of neutrons and gamma rays. When it began to fall back to the lagoon surface a critical base surge — a 200 to 300 foot wave of radioactive fission products — rolled over the ships in the harbor drenching them with highly contaminated radioactive products. Fall-out droplets were a further serious radioactive hazard many miles "downwind." In order to produce a critical base surge the water must be fairly deep. Fortunately little water of such depth exists in harbors or water adjacent to any of our larger cities. However the blast effect of an underwater explosion in even shallow water would cause considerable damage to any nearby docks or shore installations.

SURFACE AND SUBSURFACE BURSTS — Calculations indicate that destructive earth-shock effects would probably occur to a radial distance of 1,350 to 3,300 feet from the point of underground explosion of an atomic bomb, with appreciable damage to walls, chimneys and foundations expected 1,800 to 5,000 feet from the origin. The limits of the radial distance for light damage would range from roughly 2,700 to 10,500 feet.

It has been estimated that a bomb dropped from the air, penetrating 40 to 50 feet below surface before detonation, would cause blast damage over radii of about one-half to two-thirds of the radii for corresponding damage due to an air burst. (Reflection of the shock wave from rock strata depths of less than 200 to 300 feet would probably result in an appreciable increase in the area of damage.)

It seems highly probably that the shock and below-surface rock displacements would produce damage to any underground structures such as subways and foundations.

Wall-bearing buildings would undoubtedly collapse at considerable distances from ground zero. Wood-frame buildings would resist reasonably well. Brick piers would fall as would brick chimneys.

AIR BURST— Greatest overall destruction is caused when the bomb is exploded at an altitude of approximately 2,000 feet. The major effects of this explosion are:

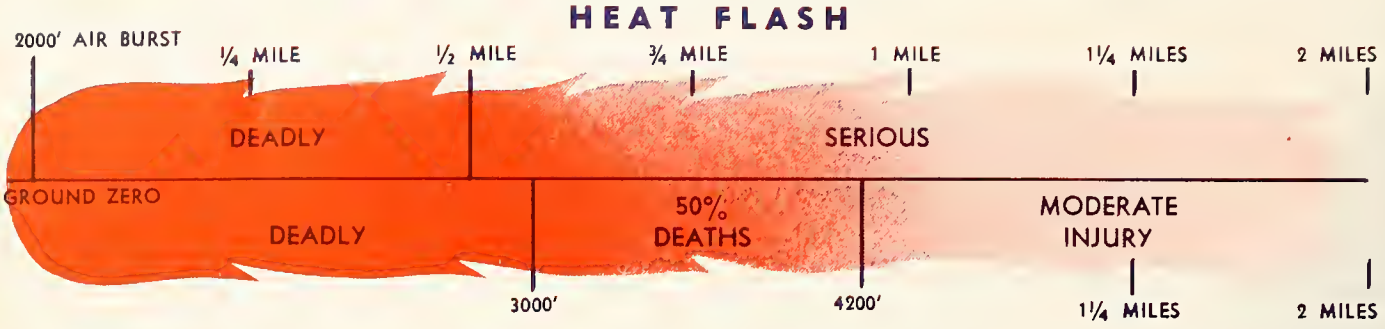
Flash Heat: Within ½ mile of ground zero, flash burns caused by heat from the fire ball will be fatal to all exposed persons. Up to 1½ miles, the skin may be charred black and destroyed when unprotected. Flash fires, igniting inflammable material up to 4 miles away, create a mass of fires simultaneously over a great area, though most of these are blown out by the following winds. This heat is gone within 1 to 3 seconds after detonation.

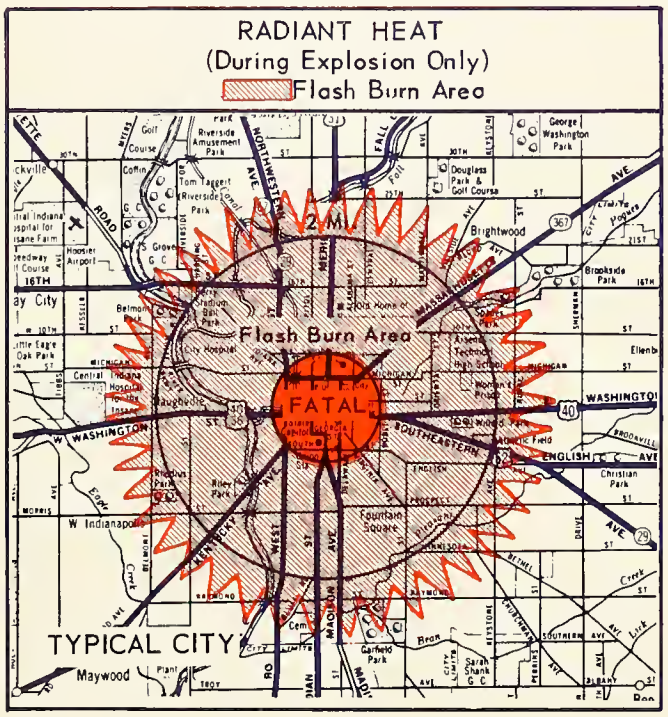
Shock Wave and Blast: When the fireball is created, a shock wave forms about it. This is a shell of air compressed so tightly that it glows whitehot and expands with tremendous force — from this expansion and the following winds greatest destruction is caused. Depending upon terrain, the wind may rip houses apart 4 miles from ground zero, cause minor damage at 6 miles and smash plaster and glass up to and beyond 8 miles.

Radiation: Two "types" of radiation are released the instant the bomb explodes. **Non-penetrating** — alpha and beta radiation — are stopped by the thinnest shielding, such as a sheet of paper or even the skin for alpha; just several hundred feet of air for beta. Neither alpha or beta radiation presents any danger from an air burst. **Penetrating radiation** — gamma rays and neutrons — are the most dangerous. Neutrons do not extend great distances from the bomb. Their greatest danger is when they penetrate objects in great strength and irradiate those objects, causing lingering contamination of dangerous intensity. Gamma rays have high penetrating powers and extend for a considerable distance from ground zero. They will probably be fatal to 50% of all exposed persons within 4,200 feet of ground zero.

Source: AEC Effects of Atomic Weapons.

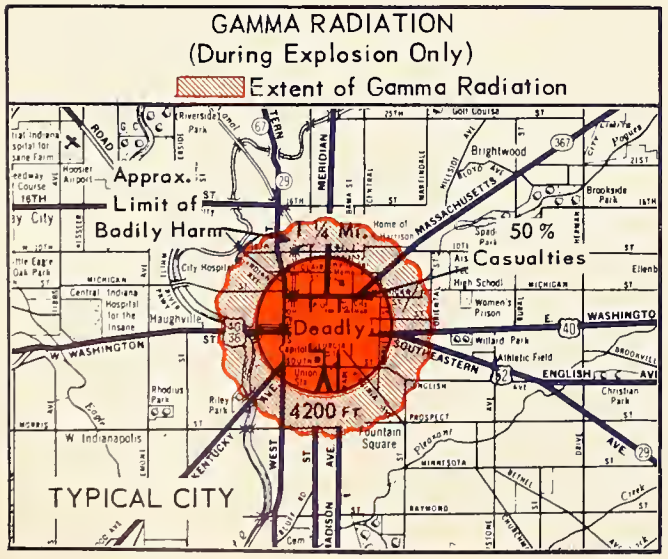
DAMAGE EFFECTS OF AN





THERMAL EFFECTS

At the time of the explosion a terrific heat flash is generated. It goes out in straight lines from the explosion and lasts 2 or 3 seconds, but during that time it can burn unprotected skin at distances of 2½ miles and has been felt up to 5 miles. It has scorched telegraph poles at 2 miles. FIRE, set directly by the flash of radiant heat, or started by the ignition of gas from disrupted mains, or short circuits, can destroy huge areas. In Nagasaki, it was estimated that almost **immediately** after the detonation, fires were started in dwellings within a radius of 3,000 feet from ground zero. Debris-choked streets usually hamper or make fire fighting difficult. **If survivors will personally fight the small fires in their immediate area, huge conflagrations may never develop.**



RADIATION EFFECTS

In an air burst, gamma rays and neutrons present the only danger. If however, a person is protected against gamma radiation, they will be safe against neutron exposure. Gamma radiation will kill half af all people fully exposed at a distance of 4,200 feet from ground zero; beyond this point the intensity falls off rapidly, and the limit at which it may cause bodily harm of any consequence is 1¼ miles. 50% of gamma radiation is released in the first second of the explosion, 90% in 10 seconds, and radiation emission is over within 100 seconds.

Lingering radiation (residual contamination) is impossible to detect without special instruments and personnel. Following **any** atomic explosion, obey orders of local civil defense authorities.

ATOM BOMB EXPLOSION

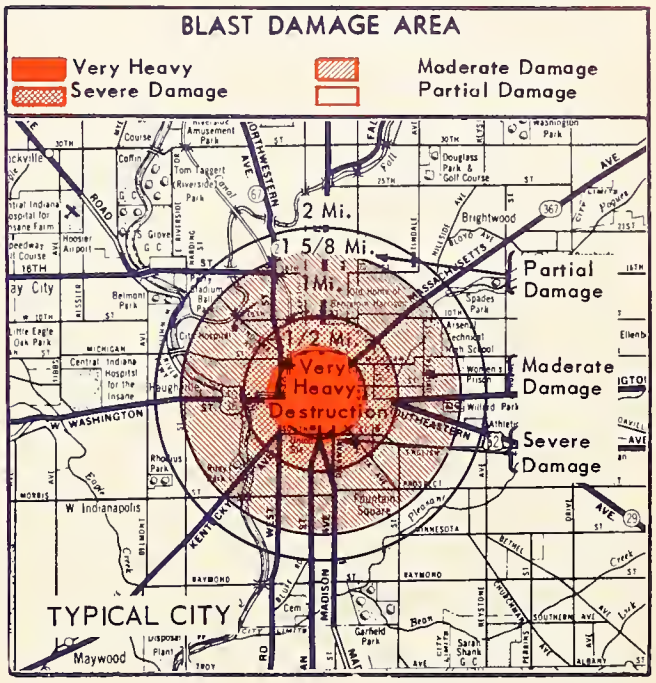
BLAST DAMAGE

GROUND ZERO — VERY HEAVY DESTRUCTION — ½ MILE — SEVERE DAMAGE — 1 MILE — MODERATE DAMAGE — 1⅝ MILES — PARTIAL DAMAGE — 2 MILES — LIGHT DAMAGE

BLAST DAMAGE CHART
(Air Burst) (AEC)

Feet	Damage (Statistics relate to Japanese explosions.)
0	Ground Zero — or directly beneath the air burst.
1,500	Mass distortion of heavy steel frame buildings.
2,000	Limit of severe structural damage to earthquake resistant reinforced concrete buildings.
2,500	To this point virtually complete destruction of all buildings, other than reinforced concrete.
3,500	18-inch brick walls completely destroyed.
4,000	Roof tiles bubbled for 2 seconds.
4,500	Light concrete buildings collapsed.
5,000	12-inch brick walls severely cracked.
5,500	Electrical installations and trolley cars destroyed.
6,000	Severe damage to entire area. Severe structural damage to steel frame buildings.
6,600	Structural damage to multistory brick buildings.
8,000	Severe damage to homes, heavy damage to window frames and doors, foliage scorched.
8,300	Moderate damage to area.
9,000	Heavy plaster damage.
10,000	Blast damage to majority of homes. Severe fire damage. Flash ignition of combustible materials.
10,300	Partial damage to structures in area.
11,000	Flash charring of telegraph poles.
12,000	Light damage to window frames and doors, moderate plaster damage.
12 MILES	— Windows shattered.

While giant skyscrapers with reinforced concrete structures and long periods of vibration should withstand the shock very well the masonry would be stripped off, girders twisted and people literally blown out of the top floors



of the buildings if within the primary blast area. People in basements, subways, or even the lower floors of reinforced concrete structures would be reasonably safe.

The delivery of A-bombs during World War II was entrusted to the B-29. Since that time the much larger and longer range B-36 (and B-36D) has been developed. According to U.S. Air Force figures it is capable of delivering the atomic bomb to almost any strategic enemy target and return. It weighs 163 tons, has a length of 163 feet and a wingspan of 230 feet. The B-50, an improved version of the B-29, and the new B-47 World's fastest bomber will probably be used to supplement the B-36.

WHAT TO DO IF BOMB FALLS WITHOUT WARNING

Your first indication of an atomic bomb burst will be an awesome glare in the sky hundreds of times brighter than the sun.

DON'T LOOK AT THIS GLARE.

1. **IF YOU ARE IN THE OPEN,** DROP TO THE GROUND INSTANTLY, BACK TO THE LIGHT, AND TRY TO SHADE YOUR BARE FACE, NECK, ARMS AND HANDS. THIS WILL NOT PROTECT YOU FROM GAMMA RAYS BUT WILL PROTECT YOU FROM BURNS which can hurt you far beyond the limits of radiation effects. (See photo No. 1)

KEEP YOURSELF DOWN FOR AT LEAST 10 SECONDS. THE IMMEDIATE DANGER IS THEN OVER AND YOU CAN GET UP AND LOOK AROUND AND DECIDE WHAT TO DO NEXT — IF YOU ARE ABLE.

2. **IF YOU ARE IN THE STREET,** DUCK BEHIND A TREE OR INTO A CORNER OR A DOORWAY IF IT IS ONE LEAP OR SO AWAY. BEND OVER, BACK TO THE LIGHT, SO AS NOT TO EXPOSE UNPROTECTED PARTS OF THE BODY — BUT IF SHELTER IS SEVERAL STEPS AWAY, DO NOT TRY TO MAKE IT. FALL TO THE GROUND AS IF YOU WERE IN THE OPEN AND THEN WAIT 10 SECONDS.

THEN PRESS YOURSELF TIGHTLY AGAINST A BUILDING IF YOU CAN, TO AVOID SHATTERED GLASS OR FALLING BRICKS. (See photo No. 2)

3. **IF YOU'RE AT HOME OR IN THE OFFICE,** DROP TO THE FLOOR, BACK TO A WINDOW, OR CRAWL BEHIND A DESK OR TABLE. THERE IS A LITTLE TIME LAG BETWEEN THE GLARE AND THE BLAST WAVE, SO FOR A FULL MINUTE STAY AWAY FROM THE WINDOWS AND THE DANGER OF FLYING GLASS. SAFEST PLACE INSIDE A BUILDING IS AGAINST AN INTERIOR PARTITION WHICH **MAY** BE STRONG ENOUGH TO RESIST COLLAPSE.

(See photos No. 3 and 3A)

AVOID PANIC — BE CALM . . . MASS HYSTERIA

WHAT TO DO IF YOU HAVE ADVANCE WARNING

AIR RAID instructions

Published by the FEDERAL CIVIL DEFENSE ADMINISTRATION

AIR-RAID ALERT (immediate attack) — 3 minute wailing siren or short blasts

ALL-CLEAR (attack over) — 3 one minute blasts, 2 minutes silence between

1. Move at once to designated shelters or disperse as directed. In the event special shelters have not been prepared, go to the nearest subway or deep basement.

2. If no adequate shelter is nearby, within 3 or 4 minutes walking distance, you can still protect yourself against flying debris and some of the heat effect. Get away from frame buildings and trees. Lie down, preferably in a ditch, behind a wall, in a ravine. Protect your eyes from the flash by covering your eyes with your arm. If not, you may be temporarily blinded. Remain under shelter for a few minutes after the blast, to be sure all flying debris has landed.

3. If able, try and help any injured people near you. Administer first aid when possible. Put out any small fires in your vicinity. Each home should have a fire extinguisher available, as chances are that city water pressure will be gone.

4. When you have done what you can in your immediate vicinity, report to the place designated by civil defense authorities, as you will be needed to help in rescue work, evacuation of wounded, general fire fighting, and other emergency jobs. If no place to report has been designated, see if you can aid any of the emergency crews who will be in operation.

5. After the initial rescue work is done, check with a radiological defense man as to the safety of the area.

6. Take a shower and scrub thoroughly, with soap, three or four times to remove any radioactive materials that may have gotten on you.

7. Change your clothes, discarding the clothes you wore in the affected areas, especially shoes. **Bury them! Do not burn them!**

8. When feasible, check with a radiological defense adviser and a doctor to make sure you are well and safe.

9. Do not spread rumors. Enough confusion will exist without adding to it.

CAN SERIOUSLY HAMPER ORGANIZED DEFENSE

YOUR BOMB SHELTER

The head of every household should seriously consider where his family would go in the event of an air raid warning. While circumstances vary widely certain general rules will be helpful in aiding you to select the safest shelter area in your home. In the case of apartment houses, or apartment hotels, the property owner or manager should survey his building to determine the best shelter area for its occupants.

(1) In the large apartment house, or apartment hotel, several stories in height, the best shelter area may be an inside corridor, hall, or stairwell on a lower floor and as far away from outside walls as possible. In a private dwelling the basement will probably be best.

(2) Shelter area should have a minimum of glass, and in no case should area have large glass windows, or large glass doors.

(3) Shelter area should have a minimum of 2 exits. In case of a basement one exit should be an outside one. In setting aside a basement shelter area in a private home some consideration should be given to reinforcing the ceiling of the area to prevent possible collapse of structure above into your shelter.

(4) A means of ventilation should be available, or provided. Nearby sanitary facilities would be desirable.

(5) The area should contain no steam furnace, or boiler; no large gas mains, or steam pipes, unless these can be cut off where they enter the building.

(6) There should be no inflammable, or corrosive, liquids stored in the area.

(7) Some means of emergency lighting (battery operated) should be provided; also emergency communications.

(8) Area should be large enough so that each occupant will have at least 6 square feet of floor space.

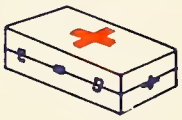
EQUIPMENT AND SUPPLIES FOR YOUR BOMB SHELTER

Your bomb shelter should be equipped with certain necessary items that may be extremely valuable when it comes time to emerge into the bomb-blasted outer world.

FLASHLIGHT OR BATTERY-OPERATED LIGHTING FACILITIES— will be found valuable since all light circuits will be put out of commission at the time of the burst.

FIRST-AID KIT— will be found essential for rendering aid to injured or to members of your own family or group.

Individual items in FCDA officially recommended first-aid kit are listed on opposite page.



PORTABLE RADIO— to keep you in contact with emergency broadcasts concerning the disaster.

FOOD AND WATER— A few cans of staple food and water in a tightly sealed jar may be most useful. Properly covered or canned foods should undergo little or no contamination. Contaminated water, when distilled, is perfectly safe for drinking purposes. The radioactive material remains behind in the residual scale and brine. MERE BOILING OF WATER CONTAMINATED WITH RADIOACTIVITY IS OF NO VALUE.

FIRE EXTINGUISHER— A small hand fire extinguisher will permit you to put out any small fires in your immediate vicinity. This may prevent these fires from spreading into a general conflagration and will be a godsend to the firefighting groups which will have their hands full trying to cope with major fires.

GLOVES — Heavy work (cotton or leather) gloves will be helpful in the event of attempting to move heavy timbers or in working in debris.

BLANKETS — may be needed for warmth or shock protection.

TOOLS — of a simple nature, such as a shovel, saw, hammer, hand ax, crow bar, pliers, knife, etc., may be necessary to remove debris from exit of your own shelter or in doing rescue work.

COVERALLS — (Loose fitting to tuck into your boots or overshoes) will provide an effective and practical working outfit that can later be discarded along with your other clothes when you have left the radioactive area.

BOOTS OR OVERSHOES — will prevent radioactive particles adhering to your shoes and at the same time will be most helpful in working in flooded areas. If overshoes or boots are not handy, you can wrap your shoes with cloth which can be discarded later along with any radioactive particles.

if bombs should fall...*how to care for the injured*

EXAMINE PATIENT CAREFULLY

- Control excessive bleeding if present. (See below)
- Provide artificial respiration if breathing is stopped.
- If you suspect extensive injury—even though not sure—treat patient as if injury is present.
- Use lipstick on forehead to mark tourniquet cases with a "T" and patients who have been bleeding heavily with an "H." (for hemorrhage).
- Splint all fracture cases before moving. A magazine or similar item fastened around the injured area will do.

CONTROL OF BLEEDING

- All bleeding must be stopped. Even slight loss of blood over an extended period of time may be fatal.
- Direct pressure applied over or on larger wounds with sterile gauze or reasonably clean cloth will control most bleeding. (Should always be tried first.)
- Along with direct pressure on the wound, pressing with the fingers on pressure points between the wound and the heart will often stop arterial bleeding.
- A tourniquet on the limbs should be used only in most extreme cases of bleeding. If used, tourniquet must be loosened every 15 minutes for a period of 7 or 8 seconds.

SHOCK

Shock is brought on by a sudden or severe physical injury or emotional disturbance. In shock, the balance between the nervous system and the blood vessels is upset. The result is faintness, nausea, and a pale and clammy skin. If not treated the patient may become unconscious, and eventually lapse into a coma.

Treatment

- Keep patient lying down.
- Don't give fluids unless delayed in getting to doctor, then give water. (Some medical authorities suggest giving patient salt and soda solution—1 tsp. salt, ½ tsp. soda to qt. of water.)
- Never give liquid to an unconscious person.
- Cover patient both under and around his body.
- Do not permit patient to become abnormally hot.
- Reassure patient, and avoid letting him see other patients, or his own injury.

BURNS

When skin isn't broken, apply petroleum jelly or burn ointment to area and bandage snugly with sterile gauze or gauze soaked in a solution of baking soda (3 tbls. to qt. of water). *If burn is deep or covers much of the body,* apply sterile gauze or clean cloth with baking soda solution, or dry dressing. (Never use grease or ointment) Call doctor and keep patient warm (not hot) and in prone position with head covered; avoid exposure to cold.

- If burn case must be transported a short distance, cover burns with clean cloth.
- Don't dress extensive facial burns. (Doing so may hinder early plastic surgery.)

WOUNDS

Minor Cuts: apply pressure with sterile gauze until bleeding stops. Use antiseptic recommended by your doctor. Bandage with sterile gauze. **Minor Scrapes:** if dirty, wash with mild soap and water, blot dry and cover scraped area with recommended antiseptic. Allow to dry—no bandage necessary. If scrape is deep and dirty, see your doctor. **Puncture Wounds:** if puncture wound extends deeper than skin surface, try to induce bleeding. Cover with sterile gauze and consult doctor immediately. Serious infection can arise unless properly treated.

SPRAINS

Elevate injured part and apply ice bag or cold cloth immediately after injury to reduce swelling. If swelling is pronounced, do not attempt to use injured part until seen by doctor. All serious "sprains" should be X-rayed for possible fractures.

FRACTURES

Pain, deformity or swelling of injured part usually means a fracture. If fracture is suspected, don't move person unless absolutely necessary, and then only if the suspected area is splinted. Give small amounts of lukewarm fluids and treat for shock.

EYE INJURIES

Foreign Bodies: remove by gently touching with moist point of clean handkerchief. Apply mineral oil or castor oil to corner of eye, and allow to flow over eye.
Chemicals: if any chemical spatters into eye, wash with milk or running water . . . without pressure. Apply two or three drops of mineral or castor oil and consult doctor at once.
Wounds: if eyeball is involved or dimness of vision is prolonged, get patient to doctor immediately. Cover both eyes with loose dressing.

UNCONSCIOUSNESS

Never attempt to give anything by mouth. Lay patient flat, turn head slightly to one side, loosen any tight clothing about neck. Always summon a doctor unless you are sure it is a simple fainting spell. In simple faint, lower patient's head to restore circulation.

RADIOACTIVITY PRECAUTIONS

Although not as dangerous as other injuries, the effects of radiation should be guarded against, especially if you were *within one mile* of an atom bomb explosion, and were not adequately protected by shelter at the time of the blast.

- As soon as possible, remove all outer clothing.
- Scrub body vigorously with soap and water, paying special attention to skin folds, hair and finger nails.
- Bury contaminated clothing.
- If you suspect radiation injury (indicated by pallor, continued bleeding, undue fatigue, or infected wound), see doctor at once.

CIVIL DEFENSE HOUSEHOLD FIRST AID KIT

These emergency first aid items are for a family of four persons or less. Assemble them, then wrap in a moisture-proof covering and place in an easily carried box. Paste this sheet to the box cover and place the box in your shelter area.

FIRST AID ITEM	QUANTITY	USE
1. Antiseptic Solution Benzalkonium Chloride Solution. 1 to 1000 parts of water.	3 to 6 oz. bottle	**For open wounds,** scratches and cuts. *Not for burns.*
2. Aromatic Spirits of Ammonia	1 to 2 oz. bottle	**For faintness,** adult dose ½ teaspoonful in cup of water; children 5 to 10 drops in ½ glass of water. As smelling salts hold bottle under nose.
3. Table Salt	1 box	**For shock**—dissolve 1 teaspoonful salt and ½ teaspoonful baking soda in 1 qt. water. Have patient drink as much as he will. Don't give to unconscious person or semiconscious person. If using substitutes dissolve six 10-gr. sodium chloride tablets and six 5-gr. sodium bicarbonate (or sodium citrate) tablets in 1 qt. water. **For some slight protection against nerve gas**—dissolve 4 teaspoonfuls of baking soda in 1 qt. water. Wash parts of body exposed to nerve gas with it or saturate cloth and place over face as gas mask.
4. Baking Soda	8 to 10 oz. box	
5. Triangular Bandage compressed, 37 x 37 x 52 in., folded, with 2 safety pins.	4 bandages	**For a sling; as a covering; for a dressing.**
6. Large Bath Towels	2	**For bandages or dressings:** Old soft towels and sheets are best. Use as bandages or dressings. Cut in sizes necessary to cover wounds. Towels are burn dressings. Place over burns and fasten with triangular bandage or strips of sheet. Towels and sheets should be laundered, ironed, and packaged in heavy paper. Relaunder every 3 months.
7. Small Bath Towels	2	
8. Bed Sheet	1	
9. Medium First Aid Dressing 8 in. by 7½ in., folded, sterile with gauze enclosed cotton pads. Packaged with muslin bandage and 4 safety pins.	2	**For open wounds or for dry dressings for burns.** These are packaged sterile. Don't try to make your own.
10. Small First Aid Dressing 4 in. by 7 in., folded, sterile with gauze enclosed cotton pads and gauze bandage.	2	
11. Paper Drinking Cups	25 to 50	**For administering stimulants and liquids.**
12. Eye Drops, Castor Oil	½ to 1 oz. bottle with dropper	**For eyes irritated by dust, smoke or fumes.** Use 2 drops in each eye. Apply cold compresses every 20 minutes if possible.
13. Flashlight	1	Electric lights may go out. Wrap batteries in moisture proof covering. Don't keep in flashlight.
14. Safety Pins, 1½ in. long	15	**For holding bandages in place.**
15. Razor Blades, Single Edge	3	**For cutting bandages and dressings, or for removing clothing from injured part.**
16. Toilet Soap	1 bar	**For cleansing skin.**
17. Splints, Plastic, Wooden, ⅛ to ¼ in. thick, 3½ in. wide by 12 to 15 in. long.	12	**For splinting broken arms or legs.**
18. Tongue Blades, Wooden	12	**For splinting broken fingers or other small bones and for stirring solutions.**
19. Water Purification Tablets	Bottle of 100	**For purifying water** when it can't be boiled, but tap water officially declared radioactive must not be used for any purpose.
20. Measuring Spoons	1 set	**For measuring or stirring solutions.**

PERSONAL INJURY EFFE

INJURIES FROM ATOMIC EXPLOSION

I. Those caused when buildings are wrecked.
II. Those caused from radiant heat.
III. Those caused by burns, either in the wreckage or otherwise.
IV. Those caused by nuclear radiation.
V. Those caused through residual contamination.

BLAST INJURIES

Direct blast injury may occur whenever the greatly increased air pressure comes into contact with body surfaces, causing multiple hemorrhages, particularly of the intestinal tract, the stomach, the lungs, the ears, and the sinuses about the nose. Direct blast is not a significant primary cause of death. Most blast injuries are the result of missiles, such as broken glass, falling bricks, etc.

The shock wave from the blast sweeps outward rapidly from ground zero and, in the case of Japan, took up to 10 seconds to travel 2 miles.

In the water, the dangerous level for pressure is about 500 pounds per square inch. In an underwater atomic explosion, any person immersed in the water probably would be killed or seriously injured up to 2,000 yards from the zero point.

Since practically all brick and light masonry buildings with weight-bearing walls in the blast area will be wrecked, wooden buildings flattened, and the doors and other partitions of blast-resistant steel-reinforced concrete buildings blown out, people in or near these buildings will be killed or injured by collapse of structures, and by missile effects of debris.

GENERAL

There are no particular problems involved in the treatment of individual injuries received as a result of an atomic attack. Standard treatment procedures can be used in treating mechanical injuries (cuts, lacerations, broken bones, concussions, etc.), burns, shock and radiation effects. Problems of a more serious nature are involved in the necessity of treating thousands of individual cases almost at once, in the immediate need for mountains of medical supplies and prompt evacuation of seriously injured to hospitals outside of the disaster area. There is nothing mysterious about radiation, as man is subject to a constant bombardment of cosmic rays. He accumulates minute amounts of radium in his body through life, and X-rays are used extensively in the treatment of certain illnesses. The only difference in atomic radiation is in the types of rays and the intensity.

FLAME BURNS

A conflagration may be expected to follow any atomic bomb blast. Fire damage light in underwater bursts.

Burns suffered from flames, in such cases, differ in no way from those encountered in any ordinary intense fires unless radiation injury has also been suffered. In Japan, there were many cases where excessive scar tissue (keloids) formed, and many of the survivors have contraction deformities not specifically related to exposure to the atomic bomb, but rather to slow healing, improper care, and infection. Burns suffered in non-atomic bomb raids resulted in comparable amounts of scar tissue, a tendency in Japanese as a race.

It would be unrealistic to prepare for fewer than 40,000 to 50,000 severely burned persons from a single atomic explosion. Fortunately, severe symptoms from radiation in those not killed outright do not ordinarily come on until several days after the acute exposure, so that those suffering from burns and mechanical injuries will actually constitute the chief immediate medical problem and make their heaviest demands on emergency facilities at a time when those suffering solely from acute radiation will require very little attention.

FLASH BURNS

The flash burns caused by an atomic explosion may be first degree, merely reddening the skin; second degree, causing blisters; or third degree, damaging all layers of the skin.

Severe burns are caused both by the radiant heat from the explosion of the atomic bomb (flash burns) and from the fires that break out in the wreckage (flame burns). The effects of visible light probably are not significant. Even those who look directly at the burst apparently suffer only temporary dazzling and loss of vision.

Atomic bomb flash burns are distinctly different from those caused by other types of explosions, since they are due to radiant heat rather than to hot gases, as in the case of shell bursts or gasoline explosions. Shadow effects are prominent. An ear, for example, might be badly burned, yet the skin behind the ear be unharmed.

As compared with flame burns, flash burns show a much smaller depth of penetration of the skin. This is due to the fact that the thermal radiation flash lasts only approximately 3 seconds. Within the depths to which the thermal radiations penetrate, the tissues appear to be completely destroyed; in a radius of 3600 feet from ground zero blackening indicates that actual charring has occurred.

Direct injury from radiant heat occurs at the explosion of the bomb; Japanese people in the open suffered third-degree burns up to 1,500 yards and second-degree burns up to 2,500 yards. The effect was instantaneous.

Even loose clothing afforded some protection against atomic flash burns, and color also had a protective effect. White clothing tended to reflect the radiant heat, darker clothing to absorb heat. Burns sometimes were cross-hatched where light clothing was marked with dark lines. Tight clothing was less protection, and burns were inflicted at elbows and where straps crossed the shoulders, for example, while other places where clothing was loose were protected or less severely burned.

As far as burning caused by thermal radiation is concerned, the essential points are protection from direct exposure for human beings and the avoidance of easily combustible materials, especially near windows.

TS OF AN ATOMIC BLAST

RADIATION INJURIES

Because of the concentration of ionizing radiation nearly everyone not protected by earth, steel, or thick concrete within a radius of approximately 3000 ft. would probably die. The most serious cases would succumb within a few hours to 4 or 5 days after exposure. A second group would develop susceptibility to infection due to destruction of their white blood cells and would die from 4 days to 6 weeks after exposure. Another group would incur multiple hemorrhages and die within 2 to 3 weeks from this cause.

THEIR TREATMENT

Many people believe that very little can be done in treatment of radiation casualties. This is true of a lethal dose; but many borderline cases can be saved by:

a. Good medical care.

b. Whole blood transfusions. It has been estimated that, for a catastrophe such as at Hiroshima, approximately 250,000 pints of blood would be needed, 80,000 per week for the first 3 weeks.

c. Control of infection by antibiotics such as penicillin and aureomycin.

d. Intravenous feeding to supply necessary sugars, proteins and vitamins.

e. Control of the bleeding tendency by use of drugs.

Whole blood would be required in great quantities, primarily to treat the casualties suffering from mechanical injuries and burns, secondarily to treat victims of ionizing radiation.

GENERAL

There is little about the effects of either old or new weapons which is new to the health professions. The atomic bomb produces burns, lacerations, amputations, crushing injuries, and blast injuries which all surgeons are accustomed to treating. Radiation sickness is a new type of wartime injury, but it is not a new disease and its symptoms are recognized by physicians, particularly radiologists.

When the dose is 400 r or less, many lives can be saved with proper treatment. Immediate hospitalization, so as to insure complete rest, and avoidance of chills and fatigue, is the first step. Whole blood transfusions should be given as required, until the bone marrow has had time to regenerate blood cells. Adequate nourishment should be provided by intravenous feeding to supply necessary sugars, proteins, vitamins, etc. Infection may be controlled by the use of penicillin and other antibiotics.

Findings in Japan show that people exposed to heavy radiation suffer various injuries, sicknesses, and malfunctions which together are called the **acute radiation syndrome.** Physicians find that the severity of the symptoms is related importantly to two factors: The amount of radiation absorbed in a single dose, and the proportion of the body exposed.

No unusual ill effects directly attributable to ionizing radiation have occurred among Japanese survivors. Whether or not such after-effects will occur among these survivors will have to be answered in the future. After-effects from radiation exposure that cannot be fully assessed for many years are effects on heredity and effects on fertility. From investigations, it is found that the likelihood of parents having deformed children after suffering sublethal amounts of ionizing radiation is very slight.

With adequate warning which is heeded and adequate shelters which are occupied, the casualties can be greatly reduced. Furthermore, doctors with ample medical supplies, hospital facilities, and blood banks can save many of those injured by blast or burns.

GAMMA RAYS

Gamma rays are very similar to powerful X-rays and constitute the greatest radiological danger in an atomic blast. They penetrate deeply into the body and ionize the carbon, nitrogen, hydrogen, and oxygen atoms, disrupting the complex body combinations of these elements, changing the proteins, enzymes and other substances that make up our cells and bodies. As a result, the cells are injured or killed; if enough cells are damaged or killed, the person becomes seriously ill or dies.

One may receive radiation producing far more serious tissue damage than a severe burn without any sensation and no damage will be apparent for several days.

In the case of such a high air blast as in Japan, some 15 to 20 per cent of the deaths probably will be caused solely by nuclear radiation. The remaining 80 to 85 per cent will be caused primarily by injuries suffered in the collapse of buildings and by burns, although many of these may also suffer severe radiation exposure.

CONTAMINATION

The chief external radiation hazard in a contaminated area will come from gamma rays thrown off by fission products or by materials made radioactive by neutrons during the explosion. Filter masks, clothing tight at the wrists, ankles, and neck, and tight-wristed gloves will afford protection against Alpha and Beta particle contamination. Material heavily contaminated with Beta-emitting material should not, however, be handled, even with gloved hands, since it can cause radiation burns. Tongs or equivalent instruments should be used. Clothing should be discarded at the edge of the contaminated area to avoid spreading radioactive contamination. Thorough soap-and-water bathing would be a valuable precaution.

Gamma radiation from contamination will not approach the power of direct bomb radiation, but it still can be severe. The best protection against contamination that gives off gamma radiation is to use instruments to detect its presence and to avoid any areas of dangerous concentration.

At a bomb burst, contaminated particles of the size which will most readily pass from the small airpockets of the lung into the blood stream ascend rapidly into the atmosphere. The chances of inhaling a dangerous amount of these small particles is small unless explosion occurs during rain or heavy overcast.

Any wound suffered in a contaminated area should be cared for in the same manner as any similar injury in an uncontaminated area. Clean such a wound with soap and water, cut out the damaged tissue, and cover the wound. Amputation is not indicated.