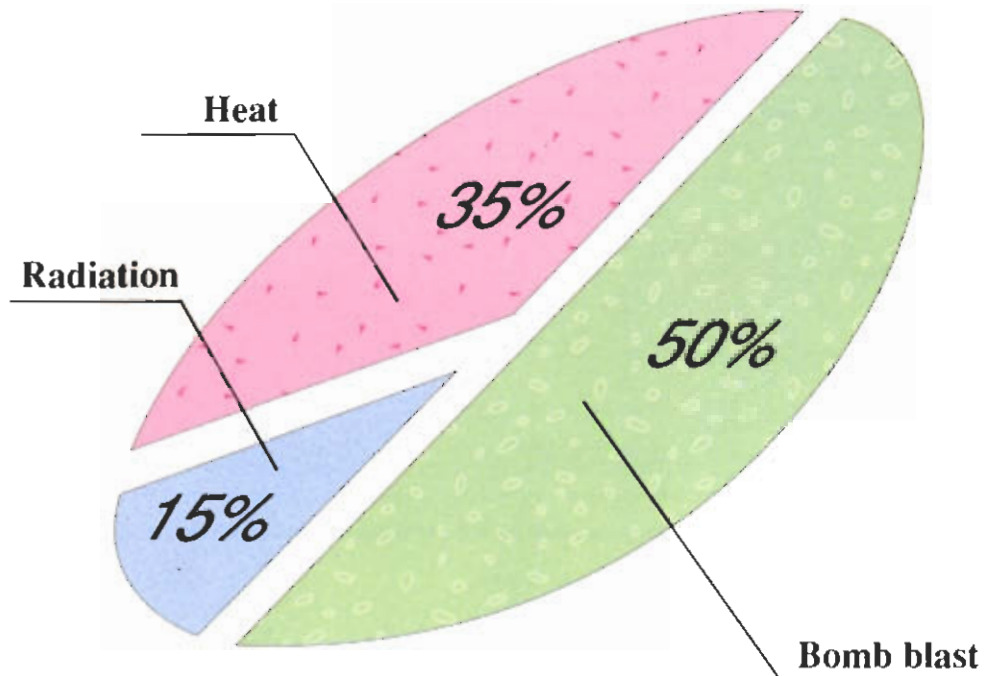


1

Damage caused by the atomic bomb

Distribution of energy released by the atomic bomb

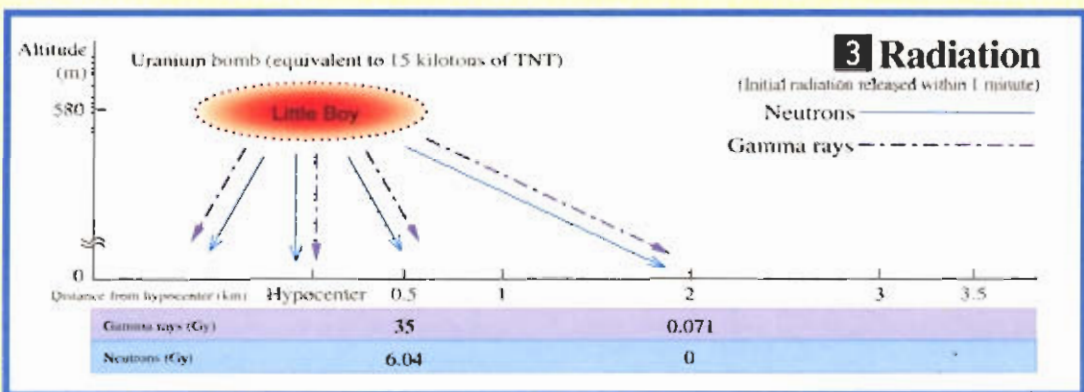
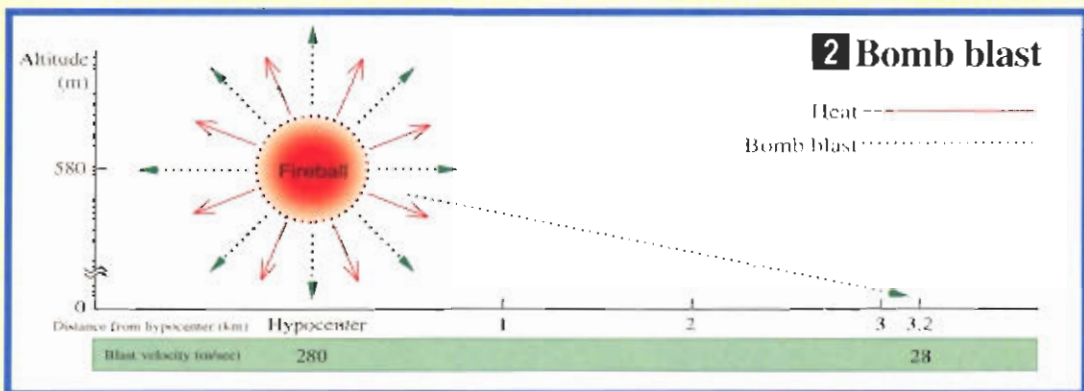
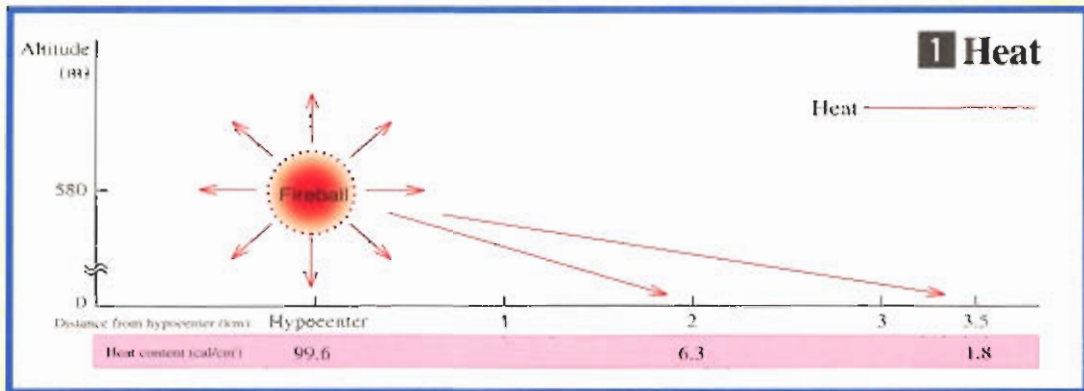


1. Energy released by the Hiroshima atomic bomb

The "Little Boy" atomic bomb exploded over Hiroshima at 8:15 a.m. on August 6th 1945 at an altitude of 580 meters above Shima Hospital, close to the A-bomb dome (the former Hiroshima Prefectural Industrial Promotion Hall).

The atomic bomb employed ^{235}U (uranium-235) and was equivalent in power to approximately 15 kilotons of TNT. The dissipation of energy is believed to have been in the ratio: bomb blast (50%), thermal rays (35%) and radiation (15%). The radiation from the atomic bomb can be divided into initial

radiation, which was released in mid-air within one minute of the explosion and accounted for approximately 5% of the total energy, and residual radiation, which was released later at ground level over a long period of time and accounted for approximately 10% of the total energy. The initial radiation was composed primarily of gamma rays and neutrons. The residual radiation is classified into two types. First, the nuclear fission products and the uranium-235 that had not undergone nuclear fission dispersed in mid-air and were converted into a radiation source consisting of gamma rays, beta rays and alpha rays. Second, the neutrons that bombarded the ground caused nuclear reactions which led to induced radioactivity.



2. Physical effects

The diagram illustrates the physical effects occurring within approximately 30 minutes of detonation.

1. Heat

On explosion, a fireball was created in mid-air. At the instant of detonation the temperature reached a maximum of several million degrees Centigrade, with the temperature on the surface of the fireball

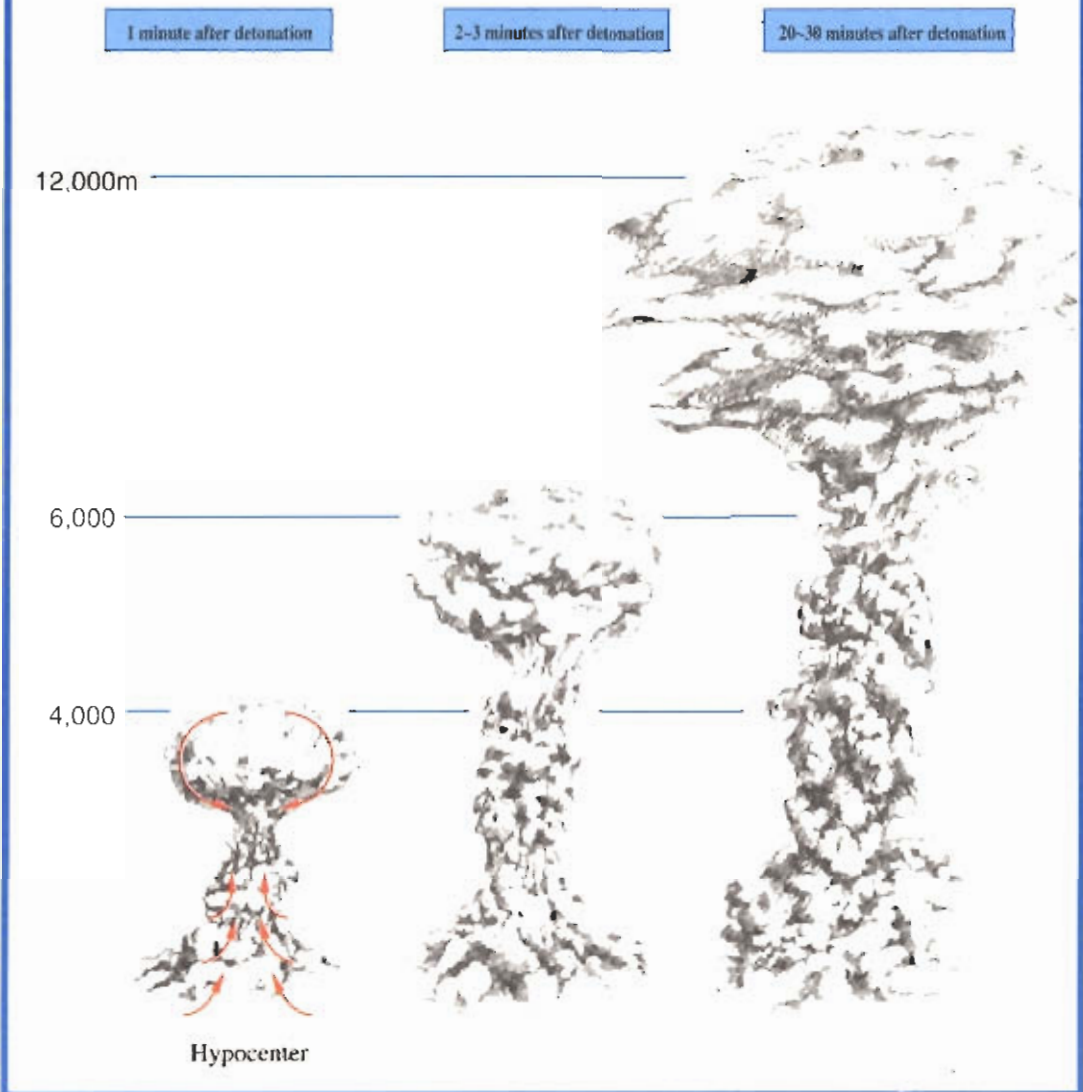
registering approximately 7,000°C after 0.3 seconds; the heat content was calculated to be 99.6 cal/cm² in the vicinity of the ground below the point of detonation (the hypocenter), and 1.8 cal/cm² at a point 3.5 km away.

The heat caused the scorching of wood etc. for a distance of approximately 3 km from the hypocenter, and for a distance of 3.5 km caused the skin burn of any human flesh that was not covered with clothing. (Please refer to the map on page 4).

2. Bomb blast

The explosion created an extremely high

Formation of the atomic bomb cloud



pressure at the point of detonation equal to several hundred thousand atmospheres; the surrounding air expanded greatly to form the bomb blast, which is believed to have attained a velocity of 280 m/sec around the hypocenter and a velocity of 28 m/sec at a point 3.2 km away. The leading edge of the bomb blast advanced as a shock wave, and had traveled a distance of approximately 3.7 km from the hypocenter after about 10 seconds, and covered a distance of about 11 km after 30 seconds. The shock wave spread outwards; at the instant that the wind had abated, a weaker blast blew inwards from the outside (due to the reduced

air pressure at the hypocenter) and produced a mushroom cloud.

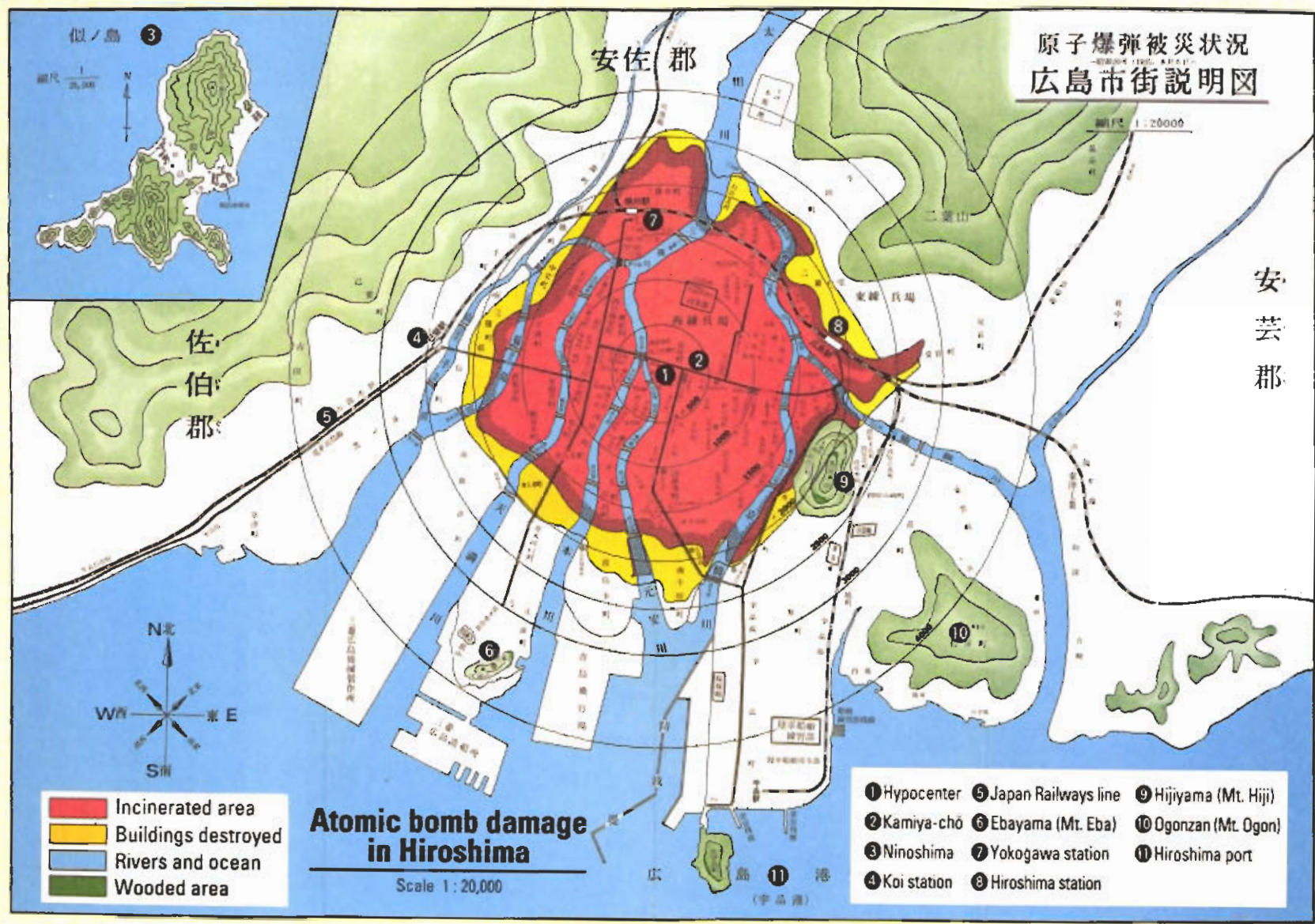
3. Radiation

The dose of initial radiation at a point on the ground 500 meters from the hypocenter was estimated at 35 Gy of gamma rays and 6.04 Gy of neutrons; the corresponding figures for a point 2 km from the hypocenter were 0.07 Gy and 0 Gy.

The above diagram illustrates the changes with time in the height and shape of the cloud produced by the atomic explosion.

原子爆弾被災状況 広島市街説明図

縮尺 1 : 20000



- Incinerated area
- Buildings destroyed
- Rivers and ocean
- Wooded area

Atomic bomb damage in Hiroshima

Scale 1 : 20,000

- ① Hypocenter
- ② Kamiya-chō
- ③ Ninoshima
- ④ Koi station
- ⑤ Japan Railways line
- ⑥ Ebayama (Mt. Eba)
- ⑦ Yokogawa station
- ⑧ Hiroshima station
- ⑨ Hijiyama (Mt. Hiji)
- ⑩ Ogonzan (Mt. Ogon)
- ⑪ Hiroshima port

似ノ島 ③

縮尺 1 : 20,000



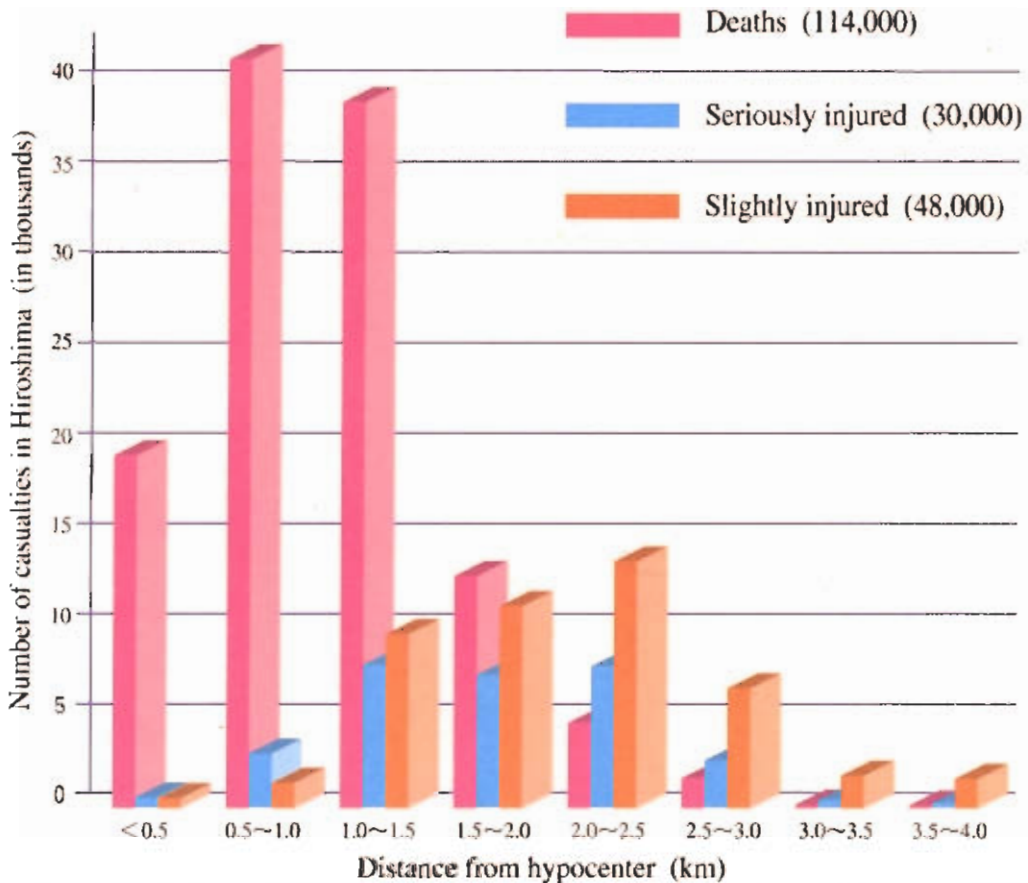
安佐郡

佐伯郡

安芸郡

広島 ⑪ 港 (宇品港)

Relationship between number of casualties and distance from the hypocenter



3. Casualty estimates in Hiroshima

In a book entitled "*Hiroshima Genbaku Sensaishi*" (published in 1971) the Information Department of Hiroshima City Office presented the number of casualties in Hiroshima based on the documents already collected by around 1947. This reported the number of dead on August 10th 1946 as 118,661 but since the number of fatalities occurring between January and August 1946 is estimated as approximately 4,000, the number of casualties up until December 1945 (the so-called short-term casualties) amounted to approximately 114,000. It is estimated that the number of military personnel

and Koreans working in Hiroshima exceeded 40,000, of whom approximately 20,000 are believed to have perished. However, the records concerning both groups are scarce, and since the actual situation is extremely unclear the figures are not included in the death toll of 114,000.

95% of the fatalities occurred among people exposed within 2 km of the hypocenter. Almost all of the approximately 30,000 severely injured were exposed at 1.0 - 2.5 km from the hypocenter. Approximately 48,000 were believed to have received minor injuries, with the vast majority exposed at a distance of 1.0 - 3.0 km.