PUBLIC SAFETY

Shelters "Inadequate"

➤ THE "DO-IT-YOURSELF" shelter program, urged by some Administration officials and a Nobel prize-winning scientist, is denounced as "ineffective" by Dr. Eugene Rabinowitch, physicist and editor of the Bulletin of the Atomic Scientists, Nov., 1961.

He terms "optimistic" widely publicized estimates that fallout shelters, homemade or otherwise, can assure the survival of 97% of the total population in the event of a heavy nuclear attack.

Fifty percent survival may be "reasonable," but only for "systematically protected populations" with well-organized construction of large, deep and heavily protected stocked shelters in areas not likely to be targets for direct attack. But even with such ideal shelters and the best of planning, the 50-50 survival estimate is uncertain, the atomic scientist states.

Dr. Rabinowitch's estimates for survival and his evaluation of individual shelters are in sharp contradiction to those of Dr. Willard F. Libby, Nobel prize winner and former chairman of the Atomic Energy Commission, who recently stated that "90% to 95% of us survive with proper protection."

According to Dr. Libby, a $30 investment in burlap bags, nylon string and needle to sew bags, railroad ties, trucking in the ties, and zinc chromate to treat the burlap bags, plus an individual's own labor, can build a four-by-six-foot enclosure, five feet high, that will give a family "100 times more chance of surviving."

Dr. Rabinowitch takes the view that: "Haphazard construction of shelters by individual citizens hoping to assure their own and their families' survival in a general holocaust will neither protect them nor help the country as a whole. It only leads to such demonstrations of human depravity as the present discussions of whether a shelter owner will have the legal and moral right to shoot his neighbors or machine gun fleeing refugees trying to invade his shelter or raid his food supplies."

The maximum possible protection of civilian population and the improvement of chances for resumption of national life after a nuclear attack require Federal planning. "Leaving it to state and local authorities or to individual householders is a dereliction of duty," Dr. Rabinowitch believes.

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ASTRONOMY

50 Years of Astronomy

➤ EINSTEIN'S THEORY of relativity leads the most important astronomical advances of the past 50 years, Dr. Harlow Shapley, retired director of Harvard College Observatory, believes.

The second most important advance after Einstein's relativity theory, Dr. Shapley said, may surprise many, including astronomers. It is the 11-volume Henry Draper catalogue of stars. This monumental work became the foundation on which many great advances in man's understanding of the universe are based.

Among the major developments of recent years, Dr. Shapley cited the epochal advances in engineering and instrumentation that have had far-reaching effects on astronomy. These include the development of large reflecting telescopes, of which the world's largest is the 200-inch Hale telescope atop Mt. Palomar, Calif., and its predecessors, such as the 100-inch at Mt. Wilson, Calif.

Other instrumental advances include:

1. The invention of the coronagraph, allowing study of the sun's outer halo at times other than when the sun's bright light is cut off by the moon during a solar eclipse.

2. The development of wide-eyed Schmidt telescopes.

3. The application to astronomy of highly sensitive photographic emulsions and of TV-like techniques to permit shorter photographing time of heavenly objects.

4. The discovery and wide use of radio astronomy, by which the radio waves broadcast by the sun, planets and stars as well as invisible objects in space are detected and analyzed to give a broader picture of the universe.

5. The application of electronic computers to astronomy, including the prediction of the positions of planets during the next 400 years, as well as in stellar structure and astrophysics.

The fall of the Tunguska meteorite in Siberia on June 30, 1908, which produced one of the biggest "bangs" of this century, was among the top highlights in astronomy during the 20th century, Dr. Shapley said.

He pointed out that only within the past 50 years had the sun and its planets been displaced from the center of the Milky Way galaxy to which they belong. They are now known to be located in a spiral arm far from the Milky Way's center. Likewise only in this century did astronomers discover that the fuzzy objects known as spiral nebulae were actually galaxies far away from the Milky Way, each consisting of billions of stars shining by their own light.

Dr. Shapley said the idea that the universe is expanding, with the untold numbers of galaxies flying away from each other at speeds approaching one-half that of light, came from studies of stellar light first made by Dr. Milton L. Humason. However, he reported, there is still no agreement among astronomers concerning the origin of the universe.

The three current theories, each with their own proponents, Dr. Shapley termed the "big bang," the "bang-bang" and the "no-bang," for a universe that is exploding, alternately exploding and contracting and exploding, and in a steady-state, respectively.

One very valuable clue concerning how stars develop, Dr. Shapley said, is known as the Hertzprung-Russell diagram. This shows the relationship of a star's color to its brightness, and also helps to estimate the distances of stars.

The Cepheid variables are an aid in finding the distances to stars, and thereby the size of the universe, Dr. Shapley told the amateur astronomers. These stars pulsate, growing alternately brighter and dimmer, and the time it takes them to go through a full cycle is an indication of how far they are from the solar system.

Two other astronomical advances of the last 50 years, Dr. Shapley reported, were the discovery that the relatively dark spots seen on the sun's surface have magnetic fields, and the finding of Pluto, the sun's outermost planet more than three and a half billion miles from the earth.

Although better measurements of the earth's distance from the sun (the astronomical unit) have since been made, Dr. Shapley said that an outstanding example of international cooperation was the determination of this distance in 1931 by astronomers from 15 countries, who carefully observed the close approach of the tiny asteroid known as Eros.

The new values for the astronomical unit are based on observations of radar waves reflected from the planet Venus. Radio wave observations also show, Dr. Shapley said, that Venus is too hot—more than 600 degrees Fahrenheit—for any known form of life. However, he pointed out, the puzzle of whether Mars could support even a primitive form of life is still not solved.

Dr. Shapley pointed out that the founding of the American Association of Variable Star Observers 50 years ago was also one of the highlights of astronomy in the 20th century. He noted that amateur astronomers had made many important contributions to the understanding of the world around us.

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AGRICULTURE

Instruments Measure The Quality of Food

➤ MACHINES are now displacing humans in another field—that of quality measurement of foods. Scientists in the Agricultural Marketing Service of the U. S. Department of Agriculture are using machines to find out the redness of a tomato, the amount of fat in commercial beef, and how much mold there is in corn.

Other instruments judge the maturity of apples by measuring the light transmitted by the sample. A still unnamed mechanism detects various quality defects in foods.

All these developments, which measure objectively food quality without destroying the sample, will help assure the consumer of better products in the market.

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