PHYSICS

Harness H-Bomb Reaction

Power for industry may come from harnessing the H-bomb reaction. Two problems of starting mechanism and control of power production remain.

➤ THE VAST power of the H-bomb may soon be harnessed for industry. Scientists of the Atomic Energy Commission are working now on the problem of controlling the thermonuclear reaction and believe this will one day become a new source of immense power for the world.

If they succeed, they will have a source of power many times greater than the atomic reactors now being built by the AEC and private industry to extract power from uranium and plutonium fission. They will give the world, right here on earth, equipment that produces energy in almost exactly the same manner as the sun.

Plans are under way to make public the possibilities of peacetime uses of the power produced by the H-bomb sometime in the near future. Discussions as to when to do this have been going on both within the AEC and on Capitol Hill.

Two big problems have to be solved before power can be produced with a thermonuclear reaction. First, a starting mechanism, not necessarily a temperature of the order of a million degrees Centigrade, must exist. Second, control must be achieved of the vast output of power that occurs when atoms of hydrogen are brought together to produce helium and a huge by-product of billions of electron volts of energy.

Some scientists in the AEC think these two problems have already been theoretically licked and are planning to see whether their solutions work in the laboratory. The solution to the triggering temperature problem is based upon work done at the California Institute of Technology by Dr. W. A. Fowler and his associates.

It is believed that an H-bomb is triggered by the "old-fashioned" A-bomb, made of plutonium. The A-bomb, at the instant of its explosion, produces the high temperature necessary to trigger the thermonuclear reaction in the hydrogen, the bringing together of the hydrogen atoms used in the bomb.

The power so produced is, of course, expended almost instantaneously in an explosion calculated to be 1,000 times more powerful than that of the A-bomb.

To get a controlled production of this power so it can be used to turn the wheels of our industries, the A-bomb obviously cannot be used as the trigger action. Scientists indicated that neither will the controlled type of uranium or plutonium reaction in a pile be used to get such temperatures. The trigger will be another method, and it may not need to involve such extremely high temperatures as are believed to be necessary in the sun.

The next step is to control the rate of fusion. There are also indications that this problem has been at least theoretically solved.

The fusion of hydrogen atoms with the production of helium plus power was accomplished several years ago in the Los Alamos AEC Laboratory and reported at the 1949 spring meeting of the American Physical Society. However, this was done on an extremely small scale. It is certain that only a few atoms fused, releasing a small amount of energy. This, however, was one of the experiments leading up to the decision to produce H-bombs.

Several different methods of fusion are open to the AEC scientists. They could try to bring together two atoms of heavy hydrogen, called deuterium, to produce helium plus energy. Or they might use one atom of ordinary hydrogen, a proton, and an atom of hydrogen three times as heavy, tritium.

Eventually the basic principles of hydrogen fusion are likely to be revealed officially, as was the case with the A-bomb in the famous Smyth report. But as with the details of the atomic bomb, the exact details of using the H-fusion reaction are likely to be held secret.

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• RADIO

Saturday, July 19, 1952, 3:15-3:30 p.m. EDT

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

George W. Bailey, executive secretary of the American Institute of Radio Engineers and past president of the American Radio Relay League, discusses "The Future of Electronics."

PSYCHOLOGY

Timing Important in Child's Personality

➤ THE IMPORTANCE of timing in helping a child develop a happy, good personality is stressed in a new booklet for parents issued by the U. S. Children's Bureau, "A Healthy Personality for Your Child" (see p. 28).

"Good timing is the key to the healthy personality," declares the author, Dr. James L. Hymes, Jr., professor of education at the George Peabody College for Teachers, Nashville, Tenn.

Just as there is a right and a wrong time to give a child a rattle, a bike or an encyclopedia, so there is a right and a wrong time to give him lots of cuddling, to give him jobs to do and skills to learn, or to let him alone.

The book is a popular summary of the Fact Finding Digest given to members of the Midcentury White House Conference on Children and Youth held in Washington last September. While it is written to help parents, it will also prove useful to doctors, teachers, clergymen and anyone who has much contact with children.

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PUBLIC SAFETY

Survival Swimming Taught

See Front Cover

➤ LESSONS IN floating, treading water, breath control, jumping, inflating clothing to make floating devices and simple swimming strokes are part of the survival swimming course developed by the American Red Cross for American youth facing future military service.

In cooperation with the armed forces, it was adapted from the functional swimming course provided military personnel during World War II when 40% of all inductees were non-swimmers. During the war, a heavy percentage of all combat deaths were caused by drowning, including many in water fairly close to shore.

Today, it is estimated that 60% of the civilian population of the country cannot swim.

Survival swimming is now being taught by the U. S. Navy at its three training stations, Bainbridge, Md., Great Lakes, Ill., and San Diego, Calif.; by the Air Force in Europe and at a few domestic bases, and at selected installations of the Army and Marine Corps.

Typical of situations which members of the armed forces might face is necessity for swimming through burning oil. In the newly developed course, the Red Cross teaches strokes to enable men to get through safely. A practice class in survival swimming is shown on the cover of this week's SCIENCE NEWS LETTER. The soldiers are using the breast stroke to splash their way through the burning oil.

An instructor's manual in basic and advanced survival swimming—the former for non-swimmers, the latter for persons with some swimming proficiency—is now being distributed to Red Cross chapters so that their volunteer water safety instructors can offer the course immediately to young men expecting induction into the armed forces in the next year. Red Cross water safety instructors already authorized are qualified to teach the survival swimming course without further training.

Science News Letter, July 12, 1952