PHYSICS

Youth's Responsibility

Taming of atomic power belongs to the young boys and girls, just as a generation ago they showed others the technicalities of radio.

➤ *THE TASK of taming atomic power belongs to youth. Just as, a generation ago, graybeards were turning to the high school boys of that day to learn the technicalities of radio, today the world must find among the coming generation the lads who understand the mysterious workings of atomic energies.*

Many of the boys and girls writing essays as part of their requirements for the Science Talent Search showed great eagerness to undertake atomic research. There is no reason to think that thirst for the subject was other than increased by the shield of silence imposed the last few years for public security.

The power that can be developed from the atom was a favorite essay topic for the first three years' contestants. Those who wrote on atomic power are now studying physics in college. A comprehensive resume of past research and predictions of future use is given in the following excerpts from essays by these winners:

➤ ALUMINUM was the first artificially radioactive element. A high-speed stream of alpha particles was directed at a target of this metal which, after the bombardment stopped, continued to emit neutrons and positrons. . . . William Hammerle, Athens, Ohio.

The nucleus of any atom is an apparent contradiction to electrical laws, for the protons, although of the same electrical charge, are tightly held together by some force that we do not yet understand. It has been known for some time that if we could destroy this bond, tremendous amounts of energy would be released. . . . Clifford Schwartz, Niagara Falls, N. Y.

Since the nucleus characterizes the entire element, its weight and the number of electrons involved in chemical reactions, as well as the radioactive properties of the element, most atomic research now concerns the nucleus. . . . Anne Hagopian, New York.

To convert an atom into energy, the strong electric bonds which tie the nucleus to the electrons must be broken. This may be done by using a high-speed particle to "shoot out" the nucleus. If the nucleus is only split, or captures the bombarding particle, an entirely different atom is the result. If the nucleus of the new atom is not stable, it will disintegrate, liberating energy. . . . Murray Gerstenhaber, Bronx, N. Y.

The nucleus splits into a few parts, the energy of the reaction being given off partly as gamma rays but mostly in the form of kinetic energy of the moving fragments—in other words, heat, since heat is molecular motion. Among the products are a few fast neutrons. If these neutrons are slowed up and returned to the uranium mass, the same process will repeat itself. . . . Victor Mayper, Jr., Manlius, N. Y.

Once nuclear fission has occurred, a reaction which lasts 10-12 seconds, the two resulting particles which are themselves unstable disintegrate with the emission of neutrons. So it happens that a single neutron which possesses an energy of the order of five electron volts causes a fragmentation which produces fully 100,000,000 to 200,000,000 times more energy and at the same time leads to the production of more neutrons. These resulting neutrons, if slowed down, further the fission process and make it a self-propagating or chain reaction. . . . Murray Rosenblatt, New York.

In breaking up, the atoms take on great speed which is soon transformed to heat. It would require nearly 200,000,000 volts to duplicate this. Or, in comparison, coal is nearly 50,000,000 times feebler than U-235 in reaction. . . . Hillman Dickinson, Independence, Mo.

It is the opinion of many that this will be a long war. U-235 is a weapon which could end it quickly, but it must be our weapon, and we know that Nazi scientists are working on it too. . . . Beatrice Meirowitz, New York.

The study of atomic structure opens many opportunities for research to the chemist. Very interesting experiments with isotopes ought to be possible, particularly in the field of organic chemistry where isotopic carbon and hydrogen compounds and combinations of isotopic and normal forms may be prepared and analyzed. . . . Joan Kunkel, Garden City, N. Y.

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The element *silicon* is hard enough to scratch glass.

An *invisible compound* made from a secret organic formula fluoresces a brilliant green under ultraviolet light; if an object sprinkled with it is touched by a thief, his hand is identifiable for days.