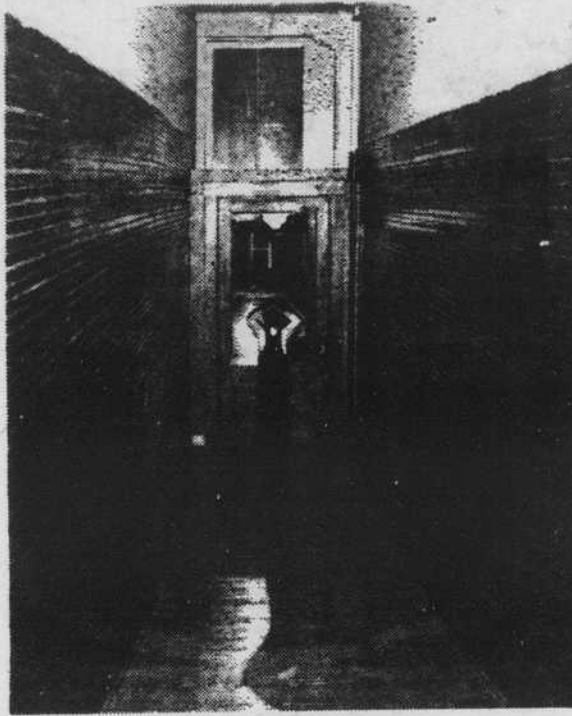
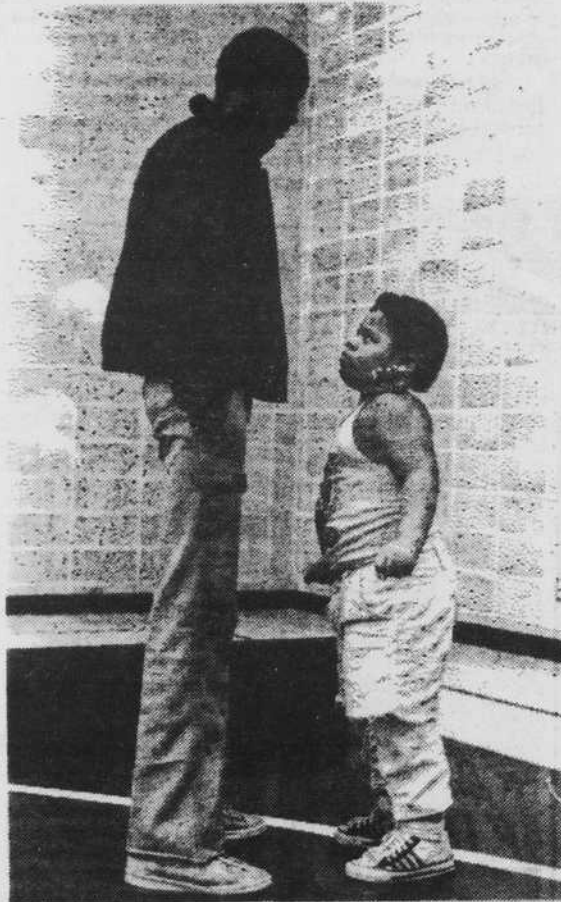


## Boys' Club Members Win National Prizes



LIFE'S HALLWAY

Mark Watkins, 11, Connersville, Ind., won the second prize of a \$75 Kodak gift certificate in the 13-and-under category of the Boys' Club/Kodak Photo Contest for this picture. He will also receive a Kodak Centennial Medallion for excellence in amateur photography as part of the company's 100th birthday celebration.



"I DARE YOU"

Stacy Roberts, 15, Waterloo, Iowa, won the 14-through-18 category prize of a \$50 Kodak gift certificate in the "What My Camera Sees at the Boys' Club" division of the Boys' Club/Kodak Photo Contest for this picture. He will also receive a Kodak Centennial Medallion for excellence in amateur photography as part of the company's 100th birthday celebration.

Thirty-seven Boy's Club members have received prizes in the form of Kodak gift certificates in the 1980 Boys' Club/Kodak Photo Contest, conducted by Boys' Clubs of America and sponsored by Eastman Kodak Company.

Each will receive a Kodak Centennial Medallion for excellence in amateur photography as part of the company's 100th birthday celebration.

Steve Boyd, 13, Martinsburg, W. Va., won the \$100 first prize gift certificate in the 13-and-under category for an architectural-type shot homes, in color, entitled "Green and Yellow."

First prize winner of \$100 in the 14-through-18 age category is Sinan Atooli, 15, Youngstown, Ohio. His winning black-and-white entry, "Do Butterflies go to Heaven?" is a result of fast shooting when he saw a butterfly land on a little girl's finger.

The Boys' Clubs to which the two top winners belong will receive \$100 awards from Kodak.

Second and third prize winners in the 13-and-under category, who received \$75 and \$50 gift certificates, respectively, are:

Mark Watkins, 11, Connersville, Ind., for a black-and-white picture entitled "Life's Hallway."

Russell Davis, 11, Parkersburg, W. Va., for a solarized black-and-white picture of a guitarist entitled "Surreal Song."

In the 14-through-18 category, second and third prize winners of \$75 and \$50 are:

John Popowich, 16, Garfield, N. J., for a picture of two horses of contrasting color sharing food, which he named "Brotherhood."

Bruce Siskawicz, 16, Carnegie, Pa., for a picture of a musical group aptly titled, "Rock 'N' Roll."

A special subject matter division of the contest, "What My Camera Sees at the Boys' Club" awarded a \$50 Kodak gift certificate in each age group. These prizes went to Robbie Carter, 12, Kingsport, Tenn., for "Koncentration," showing young spectators watching a pool player, and Stacy Roberts, 15, Waterloo, Iowa, for "I Dare You," a posed confrontation in a gym between a tall, thin boy and a challenging much shorter one.

The prize awarded to the 29 runners-up is a \$25 Kodak gift certificate.

Judges in the National Boys' Club/Kodak Photo Contest were Arthur Rothstein, photography editor, Parade Magazine; Lucy Evank, a photo editor for Scholastic Magazines, Inc.; Joseph S. Lada, director of photography, The Image Bank, and Frank Pallo, Eastman Kodak Company.

## ENERGY UPDATE

### CAN WE SAFELY DISPOSE OF NUCLEAR WASTES?

By Floyd Culler

Floyd Culler, president of the Electric Power Research Institute, spent 30 years with Oak Ridge National Laboratory. He has been elected to the National Academy of Engineering, and is a fellow of the American Institute of Chemists.



Floyd Culler

There are ways to dispose of radioactive wastes safely which have been technically demonstrated at small scale. The science and technology is available to permanently sequester the wastes. But the controlling factor is public perception and acceptance of the possible technical solutions. Public knowledge and understanding of the issues are, in part, confused by many wrong impressions about the nature of and the potential hazards of radioactive wastes, when fixed as insoluble glass and stored in small zones of geologically stable parts of the earth.

I think that the best solution for disposal of high-level waste starts with making insoluble glass or ceramics from the residues produced, following reprocessing of fuel from nuclear plants. These glasses, protected in corrosion-resistant containers, can be placed in carefully selected geological formations, such as salt beds or dry enclosures in granite rocks. The reprocessing step removes valuable plutonium and uranium from the wastes and returns these fuels to a reactor where they undergo fission to generate power.

If wastes are stored in deep salt beds, there is no problem of contaminating normal water supplies, because all of the normally used water occurs in the first few hundred feet below the surface of the earth, particularly in regions where disposal is considered. These deeply buried, stable, and geologically protected beds are most useful where they are from 1,000 to 3,000 feet deep and are sandwiched between hundreds of feet of very tight layers of shale. Many such natural deposits exist which extend for thousands of square miles. The layers of shale, salt, and again, shale were put down by the great inland seas 300 million years ago. Obviously, the salt beds would not exist if water flowed there, because salt is soluble. The salt is protected from water intrusion, glaciers of the ice ages, and surface floods by thick layers of shale. The salt layer itself is very slightly

plastic (somewhat like candle wax); if dug or cracked, it will reseal itself.

Actual subsurface area required for nuclear power waste disposal is very, very small. If the United States were to build 1,000 reactors in the next 20 years, which is now extremely unlikely, the accumulated wastes from all of these plants could be stored in about 1,200 acres of salt under the ground. Compared to this requirement, one single deposit of bedded salt covers about 10,000 square miles, or 6,400,000 acres.

In these 1,200 acres, the nuclear wastes would be contained in six-inch cylinders, ten feet long, placed on 25-foot centers, so that most of the area would be occupied by salt between the canisters. So, there certainly is no problem insofar as availability of a safe disposal site is concerned.

There are other formations, such as granites, tuffs, limestone caverns and, for low-level wastes, the tight shales which will protect radioactive wastes.

Unreprocessed fuel elements from the reactors now operating can be stored very safely in heavily protected water-cooled, or air-cooled, basins at or near the earth's surface. The current practice of storing unreprocessed power fuel is the necessary first step in an acceptable nuclear waste disposal scheme.

But I think the safest course of all is to reprocess the fuel elements after they have been removed from the nuclear reactor. The residual plutonium and uranium can then be used to produce more nuclear fission power. This would remove those long-lived radioactive elements, leaving only those shorter-lived fission products which decay to innocuous levels in 1,000 years or less. Such innocuous levels would be about equal to a natural source, such as the uranium ores on our Colorado Plateau.

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