"If the advantage of threaded nails is that they are hard to withdraw, then the advantage of smooth-shanked nails is that they are easier to withdraw. So, when you erect temporary structures like scaffolds, you would use plain-shanked nails, because they would come out easily when the job is done.

"To make the job easier still, why not design the nail with an extra head, so that you can get the hammer claw under it without scarring the wood? And thus you have the nail with a duplex head."

It is this kind of designing with an eye to function that makes today's nails more serviceable and convenient, longer lasting on the job and harder holding.

Reaching into a large glass bowl resting on his desk and filled with hundreds of different nails, Dr. Stern fished around a few moments and pulled out two very dissimilar fence staples. One was the common U-shaped staple, its smooth shanks of equal length.

The second staple had one shank twice the length of the other, and this longer shank was ringed with annular threads.

"Now, suppose you are putting up a wire fence with this old style staple," Dr. Stern said. "You will have to place the wire inside the U, hold both the wire and staple with one hand, while you try to hammer with the other.

"But if you use the L-shaped staple, you can run right down the line of fence posts, driving in the points of the longer shanks. Then you can lay the fence wire into the still open L's of the staples in a single operation. An easy blow of the hammer drives the rest of the staple in."

The annular threads of the longer shank are for additional holding power, Dr. Stern explained. The U-shaped, smooth shanked staple, while it holds firmly when first put into a post, begins to lose its resistance to withdrawal with the passing of time and may soon pull out. The L-shaped staple with a threaded shank, however, actually increases in holding power the longer it is in place.

Tests at the Wood Research Laboratory have demonstrated that there is as much as 70% increased resistance to withdrawal of threaded nails a year after they are driven into test woods.

The threaded shanks, the duplex head, the L-shaped staple—all these variations were designed to fill specific jobs better than the nails before them did. There are a thousand other nails of different style head, point, shank, material, size—or combination of these. Each was made the way it is for a purpose.

When you have a job that calls for nails, it will pay to figure out what kind of fastener would do the job best. You can be sure there is a "best" nail available for the job.

Science Service has prepared a kit containing a variety of nails of new design. A booklet accompanying the nails describes experiments that can be done to demonstrate the astonishing "holdability" of threaded nails. Besides the basic kinds of threaded nail shafts, the kit includes examples of different points, heads, metals and sizes of nails, and experiments to reveal the functions of these different nail characteristics.

These kits are available at 75 cents each from Science Service, 1719 N St., N.W., Washington 6, D. C. Ask for the Nail kit.

Science News Letter, June 6, 1953

PUBLIC SAFETY

Protect from Drowning

► NEARLY TWO-THIRDS of all drownings occur between May and September, so now is the time to think about preventing these accidents to yourself or family.

Start with the baby. There has been a "shocking" increase in baby drownings during a child's first year of "ambulation," or getting around, Dr. Harry F. Dietrich of the University of California School of Medicine at Los Angeles declares. In a report to G P, published by the American Academy of General Practice, he says it is wrong to teach an infant that he is unsinkable and to be absolutely unafraid of water. Teach the baby respect for water, not fear of it.

In answer to the old question, "When should a child learn to swim?", the doctor points out that he should learn sometime before the likelihood of unexpectedly finding himself in water over his depth.

In the education of older groups, he lists several lessons which must be taught and learned in the interest of safety.

(1) Learn to stay afloat in water.

(2) Learn to shed clothes while in the water to regain maximal swimming ability.

(3) Be impressed with the fact that many things can rob a person of his ability to swim (blow on the head, successive inhalations of water, cramp in the stomach or legs, severe allergic reaction, or extremely cold water and fear.)

There are special lessons to learn too. In various environmental situations a person must learn about currents, tides, undertow, rocks and coral. Dr. Dietrich also warns that a person must be impressed with the danger of being around or in water with a nonswimmer or a swimmer of lesser ability.

That would forestall the tragedy of the capable swimmer being drowned by or with the poor swimmer.

Elderly people need protection too. They should be encouraged to wear life jackets or have them immediately at hand.

Science News Letter, June 6, 1953

PHYSICS

Atomic Heart Found 15% Smaller Than Thought

► THE HEART of the atom, called the nucleus, which is basic to all matter, is smaller than previously thought to be by 15%.

Beams of mesons, recently discovered subatomic particles, were created in Columbia University's 385,000,000-electron-volt synchrocyclotron "atom smasher." These were used to measure indirectly, through X-ray emission and computations, the size of the atomic heart.

The nuclear radius is a few tenths of a trillionth of an inch. It is smaller for lighter elements and larger for heavier ones, with the size varying with the total number of protons and neutrons in the nucleus. Only about 1/10,000th the linear dimensions of the atom as a whole is occupied by the nucleus.

The experiments with the Nevis cyclotron have been in progress for two years by Val Fitch, graduate student, under the direction of Prof. James Rainwater.

High-energy X-rays were proved to be given off when the mu mesons enter the orbits of an atom and travel to its nucleus. A different and characteristic energy is associated with each element.

Another kind of particle, called the pi meson, is believed responsible for binding the nucleus together and for the energy released in nuclear fission as in the atom bomb. The pi meson in its decay produces the mu meson, used in the experiments. The mass, spin and magnetic moment of the mu meson were measured independently by the two Columbia physicists.

Both old and new size determinations of the atomic nucleus can be reconciled by altering the accepted mental picture of what is inside the atom. Instead of a solid nucleus of uniform density and sharply-defined edges, the nucleus may have a dense center and gradually become fuzzy at the edges.

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