

## ENGINEERING

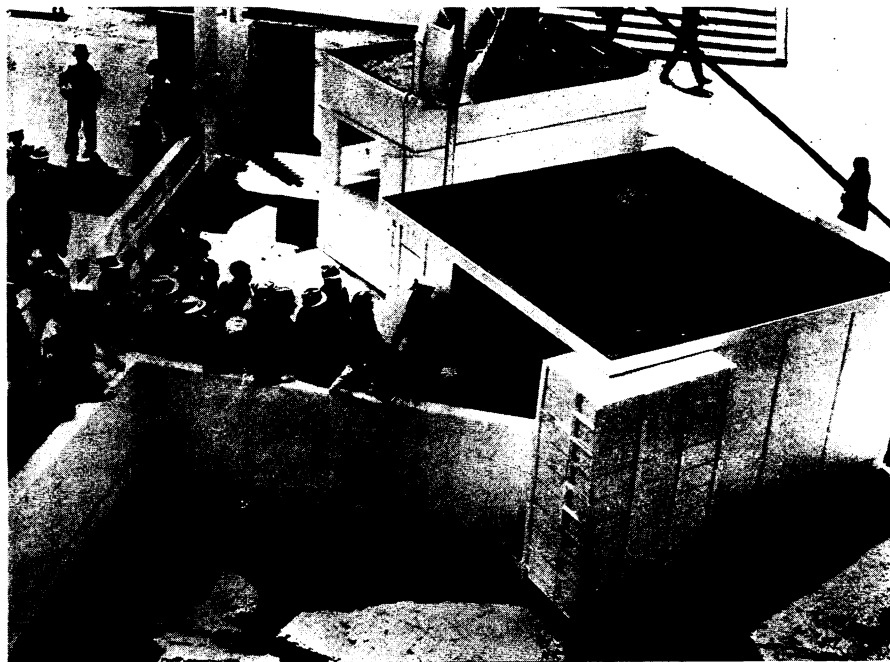
## 200 Years to Cool Boulder Dam if Not Refrigerated

**T**HE ENORMOUS amount of heat generated by the setting of the concrete in Boulder Dam would take over 200 years to leave the structure if it were not dissipated by artificial means.

When concrete sets, the slow chemical reaction that takes place gives off a large amount of heat. Researches by the U. S. Bureau of Reclamation have determined that in the case of the \$71,000,000 Boulder Dam enough heat would be generated in the 6,500,000-ton block of concrete to melt a cube of ice as high as a 24-story building.

In order to refrigerate this tremendous concrete plug between the walls of Black Canyon on the Colorado River, it is being riddled with coils of pipe as each section of cement is poured. This calls for the inclusion of some 580 miles of tubing, all of which will be left in place after the cement has hardened. But for this refrigeration, great damage, involving the possibility of dangerous cracks, would take place during a protracted cooling and shrinking period.

*Science News Letter, July 7, 1934*



### A MODERN AMERICAN'S "IGLOO"

*An exact replica of the hut which keeps Admiral Byrd warm against Antarctic blasts is now on exhibit at the Century of Progress. This tiny home, small enough to be carried by airplane, is kept warm by the same device that keeps modern refrigerators cold—paper-thin layers of aluminum foil separated by air spaces. The walls are made in panels to facilitate transportation. Each panel consists of layers of canvas, white pine veneer, paper, the aluminum foil, more paper, kapok, and repetitions of some of these layers, with plenty of air spaces interspersed. If pressed together, the materials in the walls would be only an inch and a quarter thick, yet the walls are actually four inches thick. The whole house is just the size of an automobile crate.*

## PHYSICS

## Don't Forget 137th Dimension Eddington Warns Scientists

**P**ROFESSOR ALBERT EINSTEIN with his relativity theory brought the fourth dimension into everyday vocabulary and therewith raised a hurdle for "run-of-the-mind" American intelligence which is still something of a puzzle to a three-dimensional world.

Laymen (and also more than a few scientists) who had difficulty struggling with the fourth dimension will find a new problem for them in the report of the distinguished British scientist, Sir Arthur A. Eddington, to the science journal *Nature*, in which he describes a space having 137 dimensions.

The 137th dimension, says Sir Arthur, comes into theoretical physics in connection with problems involving the determination of the electric charge on an electron, called "e," and an electron's mass "m."

The ratio of  $e/m$  for an electron is a highly important number for the newer theories of physics. It has recently been suggested, declared Eddington, that when scientists set out to measure the ratio experimentally they really obtain a value just a bit smaller—136/137 of  $e/m$ .

His theoretical papers on the subject, reports Sir Arthur, have predicted values somewhat too large; in fact, 137/136 of the correct result. This, he declares, is because his calculations did not take into account the 137th dimension, which must be used in dealing mathematically with a pair of indistinguishable particles.

If, in calculation, mathematicians pick out two particles fixed in position, and thus choose them as distinguishable, only 136 dimensions are needed. For

the more general case when any two particles are chosen, reports Eddington, the uncertainty of position adds the extra, 137th degree of freedom to the equations. Use 137 dimensions and everything will come out all right, he says.

*Science News Letter, July 7, 1934*

## BOTANY

## Eyes Upon the Ground Look Close at Beauty

See Front Cover

**T**HE advantages of humility find ready proofs in almost anything of which we can get an enlarged view from beneath—a worm's-eye view. Seen from such an angle, and with such magnification, even so common a thing as the hoary head of a dandelion becomes as spectacular as a white peacock's tail, as frozen fireworks in fairyland. The perfect specimen shown on the front cover of this issue of the SCIENCE NEWS LETTER was photographed by Cornelia Clarke. You see these flowers on every roadside, but who realizes their beauty?

*Science News Letter, July 7, 1934*