



**COTTON NOW GOES INTO ROADS**

As an extra safeguard against "washboard" roads on secondary highways and airport runways, layers of cotton sheeting are now used in the base construction. Shown above are workmen laying a "cotton" road near Birmingham, Ala.

CHEMISTRY

## Scientists Hope to Separate Gas Isotopes By Whirling

THE once-abandoned hope of physical science to separate the isotopes of a gas by whirling the chemically inseparable parts in a centrifuge is to be revived once more in new experiments at the University of Virginia.

Isotopes are the two or more varieties of a chemical element which are found to have slightly different masses although considered the same element. Thus there are two kinds of argon, two kinds of lithium, three kinds of oxygen and so on. Chemical methods will not separate them while physical methods will accomplish separation only in some cases, and then only with the utmost technical difficulty.

Prof. J. W. Beams and F. B. Haynes, assistant professor, report to the Editor of the *Physical Review* (Sept. 1), journal of the American Physical Society, that their new air-driven centrifuge, which has potential speeds of nearly 1,800 miles an hour, is so much more powerful than any similar device previously tried that the long-sought goal of science is at least worth one more attempt.

### Some Need Less Speed

The separation of some isotopes, it appears from calculations, should be ac-

complished at only half the speed which their ultra-centrifuge should attain.

The idea of centrifuging two gases to separate them was tried early in isotope research for it appeared possible to obtain the two fractions of different weights by whirling them, just as one can separate cream and milk in a cream separator.

Inherent in the new research program, which will have the greatest possible benefit to science if successful, is the development of a centrifuge rotor which will spin freely in the penetrating cold of liquid air temperatures at minus 192 degrees below zero centigrade. Operation in even lower temperature is anticipated, report Profs. Beams and Haynes.

*Science News Letter, September 12, 1936*

## ● RADIO

September 15, 2:15 p.m., E.S.T.  
STARRING A DINOSAUR—Charles W. Gilmore of the U. S. National Museum.

September 22, 2:15 p.m., E.S.T.  
NEW FACTS ABOUT FEET—Dr. Dudley J. Morton of Columbia University.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

ENGINEERING

## Cotton Roads of the South Are New Crop Outlet

DOWN in Alabama recently dusky cotton pickers, pulling long cotton sacks bulging with the fleecy staple, paused long enough at the end of their rows to watch highway construction near-by. Their attention was attracted by the laying of a canvas-like material between the layers of sand, slag and asphalt.

The Negro farm hands didn't know it, but the same substance they were picking, except in different form, was being used to build up the road. No one took the trouble to tell them, but they were seeing history in the making. Now traffic is moving over this first "Cotton Highway," a small part of an extended program being fostered by the U. S. Department of Agriculture in which some 6,167,000 square yards of cotton fabric are being provided for the building of over 500 miles of roads in 24 states.

Advocates of "cotton paving" contend that it not only reinforces the bituminous surfacing of the highway, but also prevents it from cracking and improves its resistance to water. In a broader sense it is hoped that a great new domestic market will be provided for the chief product of the southern farm.

But the cotton fabric must prove its case before being widely used in highway construction. Six bales of cotton per mile are required for the usual

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"farm to market" highway and its use increases construction costs about \$1,000 per mile. A year or more will be required for an adequate test.

The rolls of cotton fabric as they come from the mill are 82 inches wide, three rolls being required after allowing for lapping to cover 20 feet of the usual 22-foot roadway. It is laid on a coating of hot tar, then more tar applied, with other layers of slag and asphalt coming on top.

Alabama proposes to build 119 miles of cotton fabric highways using 1,260,094 square yards of the material or more than any other state. North Carolina comes next with plans for 105 miles. Twenty-two other states will use varying amounts.

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year he behaves as though when objects disappeared from his field of perception, they simply ceased to be.

"Between the ages of five and eight months," said Prof. Piaget, "when the child already knows well enough to seize any solid objects which he sees, one has only to cover them with a cloth, or place a screen in front of them at the moment when the baby's hand is directed towards them, and he will give up looking for them, and immediately lose his interest.

"I have even observed this in systematically hiding the bottle when my six-months-old son was about to take it.

"But one can see a still more curious reaction around nine or ten months, when the child is capable of seeking the object behind the screen, and the no-

tion of real exterior permanence begins to put in an appearance. For example, when the baby is placed between two pillows and he has succeeded in finding an object hidden under the right one, the object can be taken from his hands and placed under the left pillow before his very eyes, but he will look for it under the right pillow where he has already found it once before, as if the permanence of the objective was connected with the success of the former action, and not with a system of external displacements in space."

In short, Prof. Piaget summed up, the primitive world of the child is not made up of permanent objects, but of moving pictures which return periodically into non-existence and come back again as the result of the proper action.

The baby, in handling his toy will turn it until he finally gets a notion of a "wrong side" of objects. But this does not come right away. Hand a five or six months old baby his bottle and turn it around before his eyes. If the child can see a bit of the rubber nipple at the other end of the bottle, he immediately turns the bottle around, Prof. Piaget explained. If he doesn't see the nipple, he doesn't even attempt to turn it, but sucks the wrong end.

When at last the baby has built up a more correct idea of the world and the objects about him, he has still to master the problem of perspective. Even the child of five or six will feel that a mountain changes in size as he approaches it. Prof. Piaget has noted this in travelling with his own little children among the mountains of his home land.

Finally comes the problem of comprehending the perspective of other in-

dividuals. Right and left to the young child are absolute; he cannot realize that what is right to him might be left to another. Then he must get the idea of the permanence of quantity; that a row of ten beads, for example, remains just ten even though they are placed in a longer row or gathered up into a heap. And the permanence of weight, that a paste ball is just as heavy when it is squeezed out into a cylindrical shape. This development of the thought of the child parallels in a way the development of science.

"The effort by which the child escapes from his egocentricity to form a world with this social and rational instrument which the logic of relationships gives him," concluded Prof. Piaget, "is at the basis of the ever-present gigantic effort of science to free man from himself by making him realize objectively the relativity of all things."

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#### PHYSICS-PHYSIOLOGY

### Eye Can See One Millionth of an Inch

**N**EXT time you see a film of oil on a rain puddle in the pavement look for the colored light fringes. Pretty? Yes. But, more important, they indicate that your eye can detect a difference of one-millionth of an inch. That is the thickness of the oil films which produce those colors by interference. The beautiful coloring of some butterfly wings is a similar phenomenon of thin films. The best micrometer gages now in use will detect differences of only one ten-thousandth of an inch.

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