

## ENGINEERING

**98-Ton Butterfly Valve,  
A Simple Device**

See Front Cover

**A** GOOD place for a photographer to take a picture, this penstock will be serving an even better purpose when it begins to carry water through the dam to turn the huge turbines of the Ruskin power plant, British Columbia.

The flow of water through this 19 foot diameter intake pipe is controlled by the butterfly valve just behind the workman in the photograph. The entire valve weighs 98 tons and its moving disk, 47 tons. It is operated hydraulically by oil at 200 pounds per square inch pressure and when closed is sealed by a rubber tube carrying water under pressure.

The same reasons that prompt engineers to put butterfly valves weighing only a few ounces in automobile carburetors, cause them to specify butterfly valves weighing many tons for hydro-electric power plants.

They are simple; they can be turned on and off rapidly and easily because the water pressure is the same on both sides; and they offer little resistance to water flowing through them.

With the butterfly valve engineers exert first control over the power made available by their dams. After it is converted into electricity it is switched from place to place many times.

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## ASTRONOMY

**Comet Photographed 25  
Years Before Discovery**

**T**HE REMARKABLE Schwassman-Wachmann comet, which varies in brightness and remains in view of the earth throughout its circumnavigating of the sun, existed at least twenty-five years before its discovery by the German astronomers at Hamburg in 1927.

Leland E. Cunningham of Harvard College Observatory has just found that a comet located by Dr. Karl Reinmuth of Heidelberg Observatory on photographic plates made in 1902 is the same as the now famous Schwassman-Wachmann comet. The official announcement of identity of the two objects is contained in Harvard College Observatory announcement 159 now being mailed to astronomers.

The famous comet that is named after its two German discoverers is unusual

because it has a nearly circular orbit, remains more than half a billion miles from the sun, traveling between the orbits of Jupiter and Saturn, and it undergoes sudden variations in brightness.

For a comet it has an unusual behavior in its brightness. Prof. George van Biesbroeck at Yerkes Observatory finds that it changes its brightness suddenly; early this year it had one peculiar outburst which changed its brightness a hundredfold within a few days.

Never is this comet seen with naked eyes. At its brightest it is only twelfth magnitude, which means that only powerful telescopes can catch it. The Schwassman-Wachmann comet is also probably the first comet that is observable all the way around its orbit.

Although the comet was first discovered in 1927, it has been given the designation of 1925 II in astronomical literature. This is because it was nearest the sun in 1925 and it was the second comet of that year to pass perihelion.

*Science News Letter, July 25, 1931*

## ENGINEERING

**Heavier and Stronger Rail  
Designed for Railroad**

**T**HE FIRST heats of the heaviest and strongest railroad rail ever built for regular service are being rolled, it is announced by Elisha Lee, vice-president, and W. S. Franklin, assistant to the vice-president, of the Pennsylvania Railroad, in a report to the American Society of Civil Engineers.

The new rail section weighs 152 pounds per yard as compared with the former 130 pounds and is the result of intensive study by engineers of the Pennsylvania Railroad and of the United States and the Bethlehem Steel Companies. It will be rolled by the two steel companies.

Although the new rail is only 22 pounds heavier than the present 130 pounds standard, it is 75 per cent. stronger.

It will be used where traffic is heaviest. The rail that will be used on the greater part of the road is a second new type which is only one pound heavier than the present standard, but 22 per cent. stronger.

Two years of work have been spent in developing the super-rail sections. The new rail is expected to make possible the concentration of traffic, particularly freight, into even heavier train units than are now in use.

*Science News Letter, July 25, 1931***IN SCIENCE**

## ORNITHOLOGY

**Topsy-Turvy Ravens Not  
Uncommon Sight in Iceland**

**R**AVENS FLYING upside down are no rare sight in the far-off island of Iceland. So states a Danish observer, A. Vedel Taning, in a communication to the British scientific journal, *Nature*.

Commenting on a report in which a British bird-watcher reported topsy-turvy ravens as a rarity, Mr. Taning says:

"For some years I have had the opportunity of seeing many hundreds of these interesting birds in Iceland, where the number of individuals of this species apparently is rapidly increasing, probably because the refuse from the fisheries affords food for very large numbers of them. In some places—as Westmannaeyar and Hnifsdal in Isafjord—I have seen about a hundred of these birds performing evolutions in the air round favourite resting places, and here it is a rather common appearance to see the birds flying upside-down in the manner described, though I do not think I have seen them flying for so long a distance as 1000 metres, as recorded by Mr. Evershed. The upside-down flight is, so far as I can judge, not particularly connected with the courtship, though it is most often seen at the time of courtship, when air acrobatics are especially performed by the birds."

*Science News Letter, July 25, 1931*

## PSYCHOLOGY

**Slow Reading Child is Not  
Necessarily a Dull One**

**T**HE CHILD who worries parents and teachers by his difficulty in learning to read is not necessarily a dull child. Miss Frances I. Gaw, of the Seattle public schools, has found from a study of about 2,000 children in the fourth grade that decided reading difficulty exists among boys and girls of normal capacity. An intensive two-year study of 40 of the children revealed that a variety of factors are to blame. These include health, mental capacity, home conditions, and the child's emotional stability.

*Science News Letter, July 25, 1931*

# E FIELDS

## GENETICS

## Study Mentally Sick Twins To Learn About Heredity

**T**WINS suffering from mental diseases are the subjects of a comprehensive program of research being conducted by Drs. Aaron J. Rosanoff and Isabel A. Rosanoff, of the University of Southern California. These scientists have studied 200 pairs of twins having some mental disorder affecting one or both twins. They have undertaken to collect at least one thousand such cases.

The main purpose of the investigation is to compare identical twins having the same inborn characteristics with others having different heredity, thus gathering more information regarding the relative importance of heredity and environment in the causation of mental and social disorders such as alcoholism, drug addiction, crime, epilepsy, dementia praecox, and manic-depressive insanity.

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## ZOOLOGY

## Zoologist Seeks Rare Toad Carrying Young in Pockets

**T**HE SURINAM TOAD, a rare and most curious species that carries its eggs and young in pockets on its back, will be the main objective of Dr. William M. Mann, director of the U. S. National Zoological Park, when he leaves on July 22 for an expedition into British Guiana. There are a lot of other animals in South America he would like to have, Dr. Mann told Science Service, but his heart is specially set on getting a collection of these interesting toads for the new reptile house in the Washington zoo, America's newest and finest show-place for cold-blooded animals.

The Surinam toad shares its peculiar form of maternal solicitude with the kangaroo, a mammal, rated much higher in the evolutionary scale. It differs from the kangaroo, however, in carrying its offspring on its back instead of in an abdominal pouch.

When the female produces her eggs, she develops deep pockets all over her back, each of just the right size to hold

an egg. With the assistance of her mate, she manages to get her eggs into the pockets, where a natural sealing substance closes them in.

There they remain until they hatch, and indeed until the toadlings that emerge from them are ready to hop out and make their own way in the world. For the tadpoles of the Surinam toad, though they have gills and tails like toad tadpoles everywhere, never get a chance to swim until they are full grown. They pass through all the changes of their infancy in the mother's back-pockets, sticking their heads out through the covers, until at last their legs are grown. Then, relieving their mother of the burden of parenthood in a most literal manner, they hop along their independent jungle way.

Dr. Mann stated that though these toads are comparatively rare he has good hopes of getting at least one.

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## PHYSICS

## Shining Platinum Proves Best Light Standard

**M**OLTEN PLATINUM, precious metal, shining with heat, gives the world its best standard of light with which to compare the brightness of lamps or the stars.

At the National Bureau of Standards in Washington, D. C., four physicists have produced this new light standard. Using an idea suggested by Dr. G. K. Burgess, now director of the Bureau of Standards, and his associate, the late Dr. C. W. Waidner, the platinum light standard was tested experimentally by Dr. H. T. Wensel, William F. Roeser, L. E. Barbrow and F. R. Caldwell of the bureau's staff. A flame of standard type burning fuel at a known rate has been used in the past as a standard but its brilliance varies with changes in atmospheric conditions.

Platinum, pure to one part in 30,000, is fused electrically in crucibles of thorium oxide.

Comparisons with its light are made when the platinum is melting or freezing. Its temperature then is about 3200 degrees Fahrenheit. Light produced under these circumstances is remarkably constant. Reproducibility is of first importance for a standard and the values of the platinum standard are repeatable to a tenth of one per cent. The precise value of the new light standard is 58.84 international foot candles per square centimeter.

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## PSYCHOLOGY

## More Brains and Honesty Found in Only Child

**T**HE ONLY CHILD is above average in intelligence, in moral knowledge, cultural background and honesty. He is just average in cooperativeness, and persistence; but below average in self-control and in popularity as indicated by ratings made by his teacher and classmates.

This characterization of the child who has no brothers or sisters was made by Dr. Julius B. Maller of Columbia University in a report published in the scientific publication, *The Journal of Social Psychology*. Dr. Maller has been making a study of relationship between size of family and personality of the children based on data gathered in connection with the Character Education Inquiry at Teachers College.

Children in families having from two to five offspring Dr. Maller found to be superior in both moral and intellectual characteristics to those born into larger family circles.

"The children of small families are highest in intelligence, in honesty, in inhibition, and in ratings by teacher and classmates," Dr. Maller concluded.

"The children of large families are lowest in intelligence, moral knowledge, cultural background, honesty, cooperativeness, inhibition, parents' intelligence, and moral knowledge. They are highest in scores of persistence."

*Science News Letter, July 25, 1931*

## ENGINEERING

## Well in England May Be Fed by Water From France

**W**ATER spouts six feet above the ground without the aid of pumps from a well that has recently been sunk in Buckingham, England. The well is of the true artesian type and is a neighbor to a similar one opened last year which produced the astonishing flow of 6,000,000 gallons a day.

The new well penetrates the lower greensand at a depth of 1,033 feet where the pressure is sufficient to drive the water to the surface. The bore of the well is eight inches in diameter and two gate valves control the flow which has already reached half a million gallons a day. Water for this deep well is believed to come from high land as far away as France.

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