

ENGINEERING

# Hudson River Bridge Rivalled For Fame by New Arches

As Hudson Structure is Greatest Suspension Span, So Kill Van Kull and Sydney Bridges Exceed Other Arches

WHILE the completion of the great George Washington suspension bridge, which has hurled itself in one bold leap across 3,500 feet of the Hudson river from Manhattan to the New Jersey shore, is being celebrated, two other bridges, likewise the largest in the world of their kind, are being given finishing touches preparatory to their christening in the mighty stream of modern traffic.

They are twin bridges, or nearly so, for one is only two feet and one inch longer than the other; and they are built after exactly the same type of construction. They are steel arch structures that exceed their greatest predecessors even as the bridge across the Hudson surpasses the next mightiest suspension span.

These two structures are the Kill Van Kull steel arch bridge connecting Staten Island, a borough of New York City, with the mainland of New Jersey; and the Sydney harbor bridge in distant Australia.

## Almost Twice as Long

The George Washington bridge has a span not quite twice as long as that of its nearest rival, the Detroit-Windsor Ambassador bridge, which was dedicated scarcely two years ago. The two new steel arch structures likewise leap far greater distances than those covered by the famous Hell Gate bridge in New York, which has maintained its lead since it was opened in 1917. The length of span between centers of end pins of the Kill Van Kull bridge is 1,652 feet and one inch, of the Sydney harbor bridge 1,650 feet, and of the Hell Gate bridge only 977 feet and six inches.

While a steel arch may lack the delicate swinging lines of suspended cables and may not cover the superlative distances necessary to excite popular imagination, its curve must be mathematically true so that its load will not put a few girders under dangerous stress and it must be erected with the linear accuracy of one part in thousands, if millions of dollars spent for materials and the work

of technical brains for years are not to be wasted.

Inaccuracy was not a fault of either of the twin bridges. The most dramatic moment during their construction proved that. This incident was the pinning together at the keystone of the arch of the two arms which had been erected out and up into space until they met more than 300 feet above the water and over 800 feet from land.

The engineers' aim at the center of the arch was accurate to one-half an inch for the Kill Van Kull bridge and to about one inch for the Sydney structure. And this was close enough. A few minor adjustments of temporary cables and jacks supporting the arms of the arch made the fit exact.

Although statistics on the American arch, which is slightly the larger of the two, are not as imposing as those for the George Washington bridge across the Hudson; they do describe a much-needed link in New York's transportation scheme, for the Kill Van Kull bridge is the final link in joining by highway New York's most populous borough, bustling Manhattan, with the least populous—spacious, residential Staten Island.

The bridge is being finished at a cost of about \$16,000,000 with a four-lane

vehicular roadway 40 feet wide between curbs and with one footpath. Later the roadway can be widened to accommodate three more lanes of traffic or two rapid transit tracks. The arch has a rise of 274 feet from the center line of the bearings to the center of the lower chord. Under the middle of the bridge there is a clearance of 150 feet above mean high water, while for a distance of 1,000 feet across the channel, the clearance is 135 feet.

To this structure the Australian bridge has the likeness of an identical twin with the exception of a slight inclination to be short and stout. In addition to its two-foot one-inch difference in length, the bridge provides a wider roadway than *(Please turn page)*

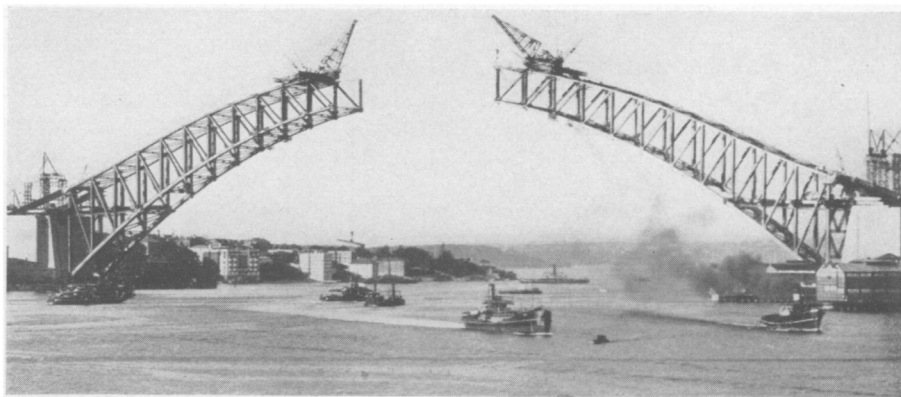
ASTRONOMY

## Nagata Rewarded For Discovery of Comet

MASANI NAGATA, melon-patch worker and amateur astronomer, has been rewarded for discovering a comet which caused his name to be spoken throughout the scientific world. The Japanese melon-farm foreman has been awarded the Donohoe comet medal by the Astronomical Society of the Pacific for his discovery last July, Alfred H. Joy, president, has announced.

The unexpected discovery was observed on the night of July 16. Nagata was making his customary observations with a three-inch telescope when the comet crossed his line of vision. Confirmation was sought and received from the Mt. Wilson Observatory. This showed that Nagata had observed the first new comet of 1931.

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AIMED AT THE "KEystone"

*That is what might have been said of the Sydney Harbor arch bridge at this period of its construction when its two halves were leaning precariously out into space, feeling for each other. The twin to the Sydney structure is the Kill Van Kull bridge, near New York City.*

its American twin. The deck has a clearance of 170 feet above high water.

The cost, however, is expected to exceed 6,000,000 pounds, a much greater sum than that needed for the American twin. This greater financial outlay may be partly explained by the fact that most of the steel work, under a stipulation of the government of New South Wales, had to be manufactured at the site,

while America's bridge was built very close to steel manufacturing centers. Huge workshops were erected near the Sydney structure to fabricate its steel.

Stone used in facing the abutments to the bridge was quarried 200 miles south of Sydney and brought to the bridge site in three 400-ton ships built especially for the purpose.

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#### ARCHAEOLOGY

## Discovery Shows Early Greek City One of "Better Homes"

**T**HE BELIEF that Greeks, before their great Hellenistic age, built fine temples for their gods but lodged themselves in small, mean houses "like wasps' nests" must be revised, declares Dr. David M. Robinson, professor of archaeology at the Johns Hopkins University. Dr. Robinson, who has returned from excavating at the ruins of Olynthus, in Macedonia, has found there new facts about city life in ancient Greece.

Digging into the streets of Olynthus, Dr. Robinson has found large houses, designed with taste and with an eye to comfort. These homes date from the fifth and fourth centuries B. C. In 348 B. C. Olynthus was destroyed by Philip of Macedon, father of Alexander.

Until now, archaeologists have excavated no city of this period of Greek history. Hence Dr. Robinson's expeditions to Olynthus are filling in many gaps in knowledge of Greek city life.

### A Greek Residence

A house in Olynthus which Dr. Robinson calls typical has been given the name House of the Comedian. One doorway from the court opens into a living room with a beautiful pebble mosaic floor in a wheel design. Around the edge of the room is a raised border three feet wide. This wide ledge was a peculiar feature of Olynthian houses. The ledge would have been a convenient foundation for couches, either in sleeping rooms or dining halls, Dr. Robinson explains. Walls of the living room in the House of the Comedian were painted in simple designs. In the floor may be seen the narrow ditch for draining off water when the mosaic floor was scrubbed.

Dr. Robinson found in this house the oldest true mosaic-paved peristyle, or

inner court surrounded by columns or pillars, that has yet been discovered in a Greek home. The court in the peristyle is paved with a mosaic floor depicting lions, wild boars, ducks, a centaur, men hunting boars and deer and griffins attacking a deer. The design is worked out in pebbles of black and white, purple and green.

On the north side of the court three rooms were placed to face the south and get the sun. This was another architectural feature common in Olynthus, and a very practical one, Dr. Robinson shows. Letting in sunlight was necessary in houses heated only by charcoal stoves and braziers.

If the House of the Comedian had only a rudimentary heating system, supplemented by heat from the sky, at least it had good plumbing. There was a shower bath, so arranged that water could be poured over the bather and drained off. There was also a terra cotta bath tub. Olynthian bath tubs were no full-length affairs, but were more of an arm-chair type.

An unusual architectural feature of the house was a bay window or balcony, ruins of which may still be seen on the first floor. Finding this was a surprise to Dr. Robinson, who points out that balconies were well known in Pompeii, much later, but none have been found heretofore in houses of early classical times.

No metal furniture could be found in the House of the Comedian or any other dwelling in Olynthus. Probably the couches and tables were of wood, long since decayed. An idea of how the homes were furnished may be had from the small articles taken from the buried ruins. In the House of the Comedian have been found 46 vases, 26 terra



**AN ACTOR FIGURINE**

*Of the fourth century B. C. of the Greek city Olynthus. This terra cotta statuette inspired the name "House of the Comedian."*

cotta figurines, 98 loom weights, seven lamps and a beautiful bronze ring ornamented with figures representing comedy and tragedy.

From this ring and from the figurine of a Greek actor, Dr. Robinson bestowed upon the house its new archaeological name, the House of the Comedian. Perhaps a patron of the theater lived there, says the archaeologist. He may also have won in a chariot race, as one of the large Attic vases found in this house, a crater, depicts Victory crowning a four-horse chariot, with another Victory in the chariot box, along with a warrior armed with a shield on which is a Gorgon's head. On the other side Victories are erecting trophies as on the frieze of the Nike temple from the Athenian Acropolis. The big vase also shows the influence of the Parthenon frieze and was probably given as a prize to the winner.

Olynthus shows the modern world for the first time what Greek city planning was like in the centuries when Hellenic civilization was on the rise. The streets of the city were neatly laid out in right angles. There were 10 houses to a block, five on each side with a narrow alley running between.

It appears that a Greek city of 50,000 people in the early fourth century B. C. was a community of "better homes" and some of them fine residences.

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