NOTE ON WIND PRESSURE.

By Prof. Henry Payne.

The author had the remarkable experience of having his residence in the track of a storm which caused considerable damage in certain restricted areas. The force of the wind was such as to demolish a chimney stack on his house, together with a similarly placed chimney stack on an adjoining house occupied by Professor Berry. He therefore has collected a few notes concerning this storm as being of interest to the engineer from the point of view of actual wind pressure experienced in Melbourne. Photographs of the two chimneys accompany this note.

The storm occurred on Monday, December 9th, 1912, being due to the centre of a cyclone which travelled over Melbourne from a westerly direction. The feature of the storm was its remarkable suddenness, and for about 20 minutes, from 9.55 to 10.15 p.m., there was a howling gale accompanied with torrential rain.

Particulars of the chief damage wrought by this storm are given in the "Argus" of December 10th and 11th, from which it is evident that there are four centres of maximum damage, in the region of (1) State School, Boundary Road; (2) Corporation Horse Yards in Sydney-road, near to which the author's residence is situated; (3) Town Hall, Fitzroy; (4) Methodist Church, North Richmond; these centres lie practically in a straight line, drawn from 9 deg. N. of W., the apparent track of the storm centre. The total distance from State School to Methodist Church is about 18,000 feet; the centres taken in the order mentioned are about 6,000 feet apart, and this seems to show that a wave-like action existed in the path of this storm.

Official records taken at the Commonwealth Meteorological Bureau show that the wind attained the velocity of 45 miles per hour, with a corresponding wind pressure of 6.1 pounds per square foot at 10.5 p.m. The barometer reached its minimum, 29.535 inches, at 10.13 p.m., and then rose rapidly at the rate of 0.05 inches per minute. Rain continued for one hour, 0.37 inches being registered, but for a brief period the pluviometer registered 0.16 inches in three minutes, or at the rate of 3.20 inches per hour.

In order to arrive at the wind pressure per square foot of surface for overturning the chimneys it was ascertained that the
brickwork weighed 130 pounds per cubic foot, thus giving a total weight of chimney of about 6,400 pounds, or 2.85 tons. The height of the chimney above the plane of fracture was 12 feet 7 inches, the greatest breadth being directly exposed to the wind, and the shape can be seen in the photographs. If the wind pressure be taken as acting uniformly over the whole surface, neglecting the tensile strength of the mortar, then the pressure intensity required to overturn the mass of brickwork could not have been less than 20 pounds per square foot of surface over the whole area of the chimney exposed to the direction from which the wind came. The wind velocity corresponding to 20 pounds per square foot of surface is 82 miles per hour, calculated on the basis of \[ P = 0.003 V^2 \], where \( P \) is pressure in pounds per square foot, and \( V \) is velocity in statute miles per hour.

**DISCUSSION.**

The President said it was not the intention of the Council that there should be any discussion in the ordinary sense of the term, but there was nothing to disentitle members present to comment on the paper or to ask the authors any questions.

Prof. H. Payne exhibited and described photographs of damage by wind at his residence.

Mr. J. A. Griffiths thought it would be of interest to members if Prof. Payne would submit a few notes, on the recent accident to a chimney at his residence, for publication in the Proceedings.*

Mr. J. A. Smith said that, when going through the Melbourne Building Regulations and the Government draft Bill the question of wind pressure was much in evidence. He found that a number of those who took part were inclined to place the wind pressure at from 18 to 20 pounds per square foot. He had had an animated discussion before 26 lbs. was recognised as possible. The highest official record was about 22. But clearly it would be injudicious to assume that we would never have a higher wind pressure than that on surfaces of moderate area.

*The “Notes” have since been received and are printed above. [Publication Committee].