1851 as about 1,000 acres, but it was not known whether those acreages were measured in summer or in winter. A considerable area of bog surrounded the Mere and was recorded as constantly flooded in winter, the waters covering an area believed to be 2 miles square. The drainage tax upon 3,000 acres would seem to indicate the area liable to inundation.

WORKS CONSTRUCTION DIVISION.

Works Construction Paper No. 13.

"Compressed-Air Caisson Foundations." †

By WILLIAM STOREY WILSON, M.C., B.Sc., and WILLIAM SULLY, MM.I.C.E.

Correspondence.

Mr. A. E. Reid observed that the Authors had done well to draw attention to the importance of the temperature and humidity of the air, as well as to the time-factor in decompression. There had been a tendency in the past to stress the importance of time in decompression and to neglect the other factors referred to above. Existing regulations appeared to be based primarily upon the experiences of the deep-sea diver and secondarily upon the tunnel worker. Mr. Reid considered that the caisson worker should be studied separately for the following reasons:

As the diver came to the surface, his air-supply was kept up and one of his principal concerns was the maintenance of body temperature, not the quality of the air he was breathing.

For the tunnel worker the decompression chamber was usually quite large and he could remain inside the chamber during decompression for a long time before the air which he was breathing became excessively polluted.

The caisson worker, on the other hand, had to be decompressed in a very tiny chamber and there was an ever-present risk that any prolonged time of decompression would result in excessive pollution of the air he breathed before he emerged to the atmosphere. Briefly, he might suffer just as much from carbon-dioxide poisoning as from the effects of compressed air, as such. That point would be well illustrated by considering the case of four caisson workers passing through the decompression chamber of the Gowring air lock described in the Paper. The volume of that chamber was approximately 92 cubic feet. Each of the men would use

† Discussed at meeting on 8 March, 1949.

up air at the rate of from 1 to 1½ cubic foot per minute during the decompression period, when it was scarcely practicable to admit fresh air to the chamber. In a typical case of decompression from, say, 36 lb. per square inch on the gauge to atmospheric pressure, the time recommended in most regulations was not less than 36 minutes for the decompression and, in some cases, much longer. The quality of the air in that case at the time of the emergence of the men might be said to defy description. Mr. Reid's own preference was for speedy decompression in the caisson air lock, because his experience had shown that quick decompression alone was rarely the cause of the onset of caisson sickness.

Caisson sickness was a much less serious problem among vertical-shaft caisson workers than it was among horizontal-shaft tunnel workers. Quite recently Mr. Reid had been concerned with the sinking of fifteen bridge caissons, all of which had been founded at terminal pressures of about 36 lb. per square inch on the gauge. In eight of those caissons the number of men employed in the working chamber was sixteen, whilst in the other seven, the number of men in the working chamber was eight. No deaths had occurred, and no cases of permanent disability had been recorded. The total number of " bends " reported on the larger caissons was eighty-seven and on the smaller caissons eight. Of the patients who had been employed on the larger caissons, sixty-one were treated by recompression and injections of morphine, and twenty-six by recompression alone. All the patients in the smaller caissons were treated by recompression and injections of morphine. In one case recovery was not complete until after 14 days' rest, but in all other cases full recovery was achieved in less than 3 days.

Mr. Reid had been directly concerned with the sinking of eighty-two pneumatic caissons, most of which had been founded at pressures well above the critical pressure of 20–21 lb. per square inch on the gauge. Only one death, directly attributable to caisson sickness, had occurred, and only two cases of permanent disability had been certified by the medical authorities.

The Authors, in reply to Mr Reid's remarks in connexion with the pollution of air inside the man lock during lengthy decompression, pointed out that ventilation could be effected during decompression by admitting a small amount of fresh compressed air and exhausting at a faster rate.

In view of the various views put forward during the discussion, the Authors would add that they were at present planning to sink in Britain one of the largest pneumatic caissons in the world. That caisson would be 164 feet long and 109 feet 6 inches wide in plan, founded at a level about 79 feet below high-water level. The structural steelwork in the shoe would weigh 460 tons and six air shafts and air locks of the " Gowring " type would be provided. In order to comply with regulations which would probably come into force under the Factory Act, 1937, " Work of Engineering Construction," Part VII—Work in Compressed Air—it had been decided

to " decant " the workmen from the " Gowring " locks after rapid decompression to atmospheric conditions, passing them quickly into horizontal auxiliary chambers of the type mentioned by Mr. Taylor. After recompression in those chambers the men would be slowly decompressed with the rate of pressure reduction, temperatures, and ventilation carefully controlled. Three of those auxiliary air-locks would be provided together with a fourth one fitted out as a hospital air-lock for medical cases.

The regulation referred to would require twice the amount of available compressed air given in the Author's rule and a decompression time at maximum pressure of 93 minutes. In the event of a total failure of the air-supply, about 120,000 cubic feet of air would be trapped in the working chamber, allowing about 2,000 cubic feet of air per man with the full complement of men in the caisson.

AIRPORT ENGINEERING DIVISION.

Airport Paper No. 9.

" The Trend of Hangar Design." †

By JOHN BIDNEY FARRANT HAWKINS, C.B.E., M.I.C.E.

Correspondence.

Mr. H. S. Crabtree observed that he wished to submit the following comments upon the Paper from the point of view of a civil-airline engineer with experience of managing airline engineering bases.

Civil Aircraft Operators' Requirements

(1) The hangar design should enable work on aircraft to be carried out at the highest rate of efficiency and at the cheapest cost.

(2) The introduction of a new type of aeroplane should not render the hangar redundant. (That should apply for a minimum of 20 years, sufficient to cover three successive types of aircraft).

(3) The hangar should be constructed so that extensions could be made without interfering with aircraft work in the existing building.

Other requirements included low first cost, low heat-losses, good artificial and daylight lighting, watertightness under conditions of high wind, availability of services (compressed air, electric power, etc.), good working conditions, and low fire risk.

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† Discussed at meeting on 25 January, 1949.