was formed by the increased speed of the falling or pulling leg being greater than the speed on the intake side. After a time, cavitation extended to a point at which the column of water in the siphon was broken in two parts, one column dropping down each leg of the siphon, which became empty. Many siphons worked better with a cock at the outlet. This required careful adjustment and close attention to get the best results. In the Nicholson automatic compound siphon, cavitation was impossible, and a regulating cock was not required. It was self-contained and self-adjusting in every circumstance that might arise. It had no mechanical action, being entirely atmospherically controlled.

Mr. Halliday stated that the whole analysis pointed to the fact that, unless the relationship in equation (14) held good, they must have a throttle outlet. If that were provided, and the velocity at the outlet equalled the velocity at the top of the pipe, cavitation would not take place. No doubt there were in that neighborhood hundreds of siphons working under these conditions without ever breaking down. He had occasion to put in a siphon recently delivering quite 3,000 gals. per minute. It was a simple siphon, with a lift of a few feet. It had been working nine or ten months now, and had never stopped once. He held that cavitation could occur with the Nicholson siphon.

Mr. Nicholson: Not to the extent of breaking up.

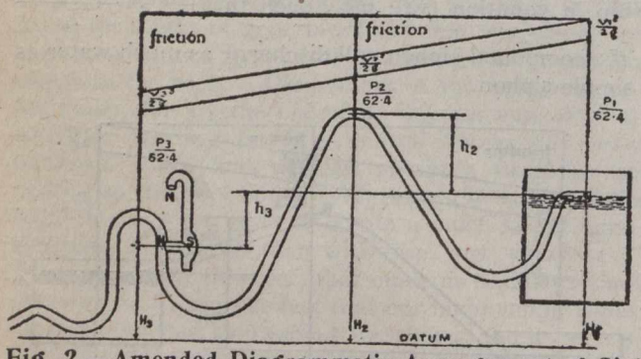

Fig. 2.—Amended Diagrammatic Arrangement of Siphon

Mr. Halliday added that, if the air-trap were fixed in a certain position given by equation (14), the Nicholson siphon would deliver as much water as any other siphon. In the previous discussion on Mr. Nicholson's paper, that had been disputed, but it was so.

Mr. Nicholson said that a short time ago he had an enquiry from a Lancashire colliery where there was a siphon working. To make sure that it was perfectly tight, they had taken the pipes off and re-laid them three times. They put a valve on the outlet and said that, when it was left at full bore—it had an excessively long leg—it simply broke up after three or four hours' working. After he put a cock on and readjusted it, however, it sometimes worked for several days.

Mr. Mark Ford remarked that there was a good deal of bother with siphons in mines. He asked whether that was because mine water contained air and gas, and that the reduced pressure at the top of the siphon caused the air and gas to cling to the top of the pipe.

Mr. Halliday replied that that might be the cause if air accumulated at the top of the siphon. When once that pressure reached a certain figure, the siphon would stop work. He assented to Mr. Ford's suggestion that the pressure of water would be reduced at that point, and that the tendency would be for the water to give up its air or gas at that point.

The president said he had seen gas gathering at the head of a siphon so that, if one opened the plug, one could have lit it. They had a lot of trouble many years ago with water containing so much gas. He dared say that that could be got rid of by regulating the outlet, so as to keep the gas out in a great measure.

Mr. Ford questioned whether there was anything to prevent the accumulation of gas at the top.

Mr. Halliday agreed that, if they had considerable quantities of gas in solution in the water, when they commenced siphoning, the gas was naturally given off at the highest point of the siphon. He asked Mr. Nicholson how he dealt with that problem.

Mr. Nicholson replied that there was a T-piece at the inlet end of his siphon, which stopped atmospheric air from getting into it. He quite admitted that gas in solution might be in the water, however. As the water passed through, this gas formed a small air lock in the first instance, and that air lock was carried through like a solid cartridge. The gas came off in small globules right through the pipe, but, if there was any flow of water at all, these globules did not adhere to the side, but were carried through. If the siphon were standinng, these globules adhered and, after a time, rose to the top. The siphon would have to stand a very considerable time, however, before there was enough gas generated from the water to break up the siphon. In practice, he thought that the amount of gas generated in the pipe was very, very small.

Mr. Halliday remarked that it might amount to 3 or 5 per cent.

BUILDING SHIPS IN RECORD TIME

The Foundation Company, on December 27th, launched the first of the ships outlined on the Imperial Munitions Board Emergency shipbuilding programme.

Last spring the Imperial Munitions Board placed several orders for wooden ships, and these are being constructed in different parts of Canada. The ships are rated at approximately 2,500 tons, and have a length of 250 ft. and a beam of 43 ft. 6 in. The elapsed time from the breaking of the ground to the launching of this ship was approximately six months, which bears testimony to the ability of Canadian organizations to rise to the assistance of their country in these times of emergency.

The Foundation Company's shipyard is in charge of W. I. Bishop, who is well known in the contracting and engineering field in Montreal and Toronto.

MOUNTAIN FOR WATER-FRONT FILL

The engineer who is undertaking the cutting down of the Costello Hill at Rio de Janeiro, Brazil, and using the material to reclaim a large area of submerged land on the water-front is Luiz Barretto Filho, of Sao Paulo, Brazil. The present property on the hill would have to be purchased, but the levelled site and the newly-filled site would become the property of the syndicate for development purposes. The cost of removing the 4,700,000 cu. yds. and depositing them in the fill is estimated at $10,000,000. The removal of this hill has been proposed at various times for more than 100 years, the object being to improve the ventilation of the city, as cool winds are now obstructed.