the average in 1911, and considerably above the average in 1912. This should also have a tendency to make the summer flow for 1911 less than the summer flow for 1912, but slightly more than the average.

3. The average precipitation for the three summer months of June, July and August is 8.29 inches. The precipitation for the summer months of 1911 was 6.51 inches, or 1.78 inches below the average. The tendency would, therefore, be for the production of a summer discharge below the average during 1911.

4. The average precipitation for the three autumn months of September, October and November is 9.74 inches. The precipitation during the autumn months of 1911 was 12.49 inches or 2.75 inches above the average. The tendency of this condition would be to produce an autumn discharge greater than the average in 1911, and also to produce a discharge greater than the normal during the winter months of 1911, and 1912.

Applying these deductions to the flow characteristics found by measurement during the years 1911 and 1912, the following conclusions are derived:—

1. The winter precipitation for 1910-11 was slightly less than the average but greater than the winter precipitation for 1912, the tendency being therefore to produce a summer flow in 1911 slightly above the average, and greater than the summer flow for 1912.

2. The spring precipitation for 1911 was slightly greater than the average but much less than the spring precipitation for 1912, the tendency being, therefore, to produce a spring run-off and consequently a summer flow, slightly above the average in 1911, but less than would obtain in 1912.

3. The summer precipitation for 1911 was considerably below the average, the tendency therefore being to produce a summer flow less than the average.

4. The autumn precipitation for 1911 was considerably above the average, the tendency being to produce an autumn and winter flow greater than the average.

As regards summer flow in 1911, we have therefore two factors, the winter and spring precipitation and the spring run-off tending to make it a maximum through the effect of ground storage, and one factor, the summer precipitation, tending to make it a minimum by reason of a summer run-off which was below the average. Inasmuch as surface flow is assumed to be the governing factor as regards the discharge of the Maitland River, it may be reasonably stated that the summer discharge for 1911 was really below the average, and also that the summer discharge for 1912 may be expected to be greater than that of 1911 and possible above the average.

In the matter of autumn and winter flow, that shown by measurement during 1911 and 1912 is probably much greater than can ordinarily be expected, as the autumn precipitation was so much in excess of the average. Smaller values for discharge are to be anticipated during the coming autumn and winter if, as seems probable, the precipitation more closely approaches the average.

To conclude this portion of the argument it may be said that, as regards the flow characteristics of the Maitland River, the outstanding features are, first, its sensitiveness to the effects of rain-fall, and, secondly, its dependence upon surface run-off as against ground storage. Therefore, while the conclusions above set forth may cover the general behavior of the river over a cycle of years, the occurrence of abnormal or unusual precipitation phenomena during some particular season may give rise to temporary conditions of flow, the nature of which it is not now possible to anticipate.

The initial decision that the Black Hole power-site was the best suited to the requirements of the commission and the county of Huron is amply justified by the results of the subsequent investigation. The minimum capacity of 10 h.p. per foot of head proves the necessity for developing under the highest possible head that topographical conditions will permit and that capital cost will justify, and also for choosing a site providing the best facilities for pondage in order to make peak load and daily storage capacity a maximum. The Black Hole site, with an operating head of 80 feet, and something over 700 acres of pondage obtainable, fulfils the required conditions more satisfactorily than any other possible location on the lower river and has been considered to the exclusion of all others.

Referring back to the table of discharge measurements, the power capacity of the Black Hole site, under an 80-foot head, upon the various dates of flow measurement, would be as follows:

| Date of measurement. | Continuous 24-hour power capacity. | Probable combined 10-hour and 24-hour capacity. |
|---|---|---|
| May 19, 1911 ..... | 6,560 E.H.P. | 10,000 E.H.P. |
| June 14, 1911 ..... | 3,680 " | 5,800 " |
| July 20, 1911 ..... | 2,000 " | 3,200 " |
| Aug. 11, 1911 ..... | 1,120 " | 1,800 " |
| Aug. 30, 1911 (min.).. | 800 " | 1,200 " |
| Sept. 18, 1911 ..... | 1,120 " | 1,680 " |
| Oct. 16, 1911 ..... | 1,680 " | 2,400 " |
| Nov. 20, 1911 ..... | 27,200 " | 38,000 " |
| Dec. 22, 1911 ..... | 8,560 " | 12,000 " |
| Jan. 27, 1912 ..... | 5,040 " | 7,100 " |
| Feb. 29, 1912 ..... | 3,360 " | 4,700 " |
| Mar. 28, 1912 ..... | 14,080 " | 21,000 " |
| April 26, 1912 ..... | 9,600 " | 15,400 " |
| May 30, 1912 ..... | 38,800 " | 62,000 " |

Considering the above figures in connection with the conclusions derived from the study of precipitation, the following general statements with regard to power capacity would seem justifiable:

1. The spring flow will, under all circumstances, produce power in excess of economic installed capacity.

2. The summer flow was probably close to the minimum during 1911 and a larger summer power capacity may be anticipated under average conditions.

3. The autumn precipitation and late autumn flow was considerably in excess of the average, so that the power capacities established by measurement during the autumn and winter of 1911-12 cannot be considered normal, and conditions much less favorable should frequently obtain.

Considering the power capacities in connection with the market demand, it is evident that even under average conditions, the summer power capacity of the Black Hole site will not be sufficient to carry the Huron county load, so that some portion of it will always have to be carried by Niagara during the summer season, and probably at times in the early autumn. Also while the autumn and winter capacity may at all times be sufficient to carry the Huron county load, it is by no means certain that sufficient surplus capacity will be available to supply auxiliary power to the Niagara system. As the Maitland River will be obliged to furnish power to the Niagara system during the autumn and winter months to compensate for power obtained from Niagara during the summer, the serious nature of this condition is evident; for unless the Maitland River can furnish auxiliary power during the peak load period when it is required, the summer power supplied by the Niagara system will have to be paid for by the county of Huron.

The projected scheme of development at the Black Hole involves the creation of an artificial head and also a diver-