WATER POWERS OF CANADA

(Continued from page 386.)

Graham, M.Inst.C.E., has made such an independent investigation of a number of the schemes and has arrived at much larger figures.

Mr. Graham has investigated 60 possible schemes in the Highlands, basing his calculations upon rainfall figures supplied by Dr. H. R. Mill, and arrives at the conclusion that an aggregate of upwards of 400,000 continuous h.p. is available, divided as follows:—

- 10 Schemes above 10,000 continuous h.p.
- 20 Schemes between 5,000 and 10,000 continuous h.p.
- 20 Schemes between 2,000 and 5,000 continuous h.p.
- 10 Schemes below 2,000 continuous h.p.
- Total. 60 Schemes.

The works necessary to develop these powers have been laid down on the one-inch Ordnance Survey and their particulars tabulated for reference. It is not, of course, suggested that all these schemes are commercially possible at the present time, but many of them are sufficiently promising to justify closer investigation.

The largest installation as yet developed in the United Kingdom is the Kinlochleven Works of the British Aluminium Co. Although the drainage area is only 55 square miles, the high rainfall amounting to 70 inches per annum and the large fall of 920 feet, are sufficient to give an output of about 30,000 e.h.p. continuously. These works are now being increased by the addition of the power to be obtained from Loch Eilde Mor.

The same company has also 7,000 e.h.p. installed at Foyers on Loch Ness.

England

While in England there are larger rivers than in Scotland, there are fewer natural lakes. The possibility of water-power development is restricted, too, by the general lack of elevation.

Such powers, therefore, as are possible would of necessity be in comparatively small units, and must be developed without storage by utilizing the natural river flow, as has been done, for example, on the Dee at Chester.

Ireland

Like England, Ireland's possibilities of power appear to lie in her great rivers. A large part of the interior of the country forms a flat plateau at no great height above sea-level. On this plateau flow large, sluggish rivers, the Erne, Corrib, Shannon, Bann, Lee, Inny, etc., most of which have a steep fall to the sea for the last few miles of their length. This feature of the rivers makes them valuable for power production. The best of the lochs lie in agricultural country, and the raising of their levels would flood much valuable arable and pasture lands. The amount of power available is probably considerable, but without much closer investigation than has as yet been made even an approximate estimate cannot be given.

Wales

In the mountainous area of N. Wales where the rainfall is high two power installations have already been established, developing some 12,000 e.h.p. There are possibilities of further development in this region which are well worth investigation. Several promising schemes have been investigated by Mr. Vaux Graham in the same way as those in the Highlands of Scotland.

General

While the possible water-powers of the United Kingdom are comparatively small, yet, occurring as they do at no great distance from industrial regions, they are relatively valuable, and every effort should be made, by close investigation, to ascertain their commercial value at an early date.

India

Very little definite information is as yet available regarding the hydraulic resources of India. The power problem in India is in general complicated by the urgent necessity for conserving as much water as possible for irrigation purposes. There are numerous great perennial canals with drop falls at fairly short intervals; there are also numerous large reservoirs. At first sight it might seem that these sources of power should be utilized. When carefully examined most of these are, however, found to be useless for power purposes, owing to the paramount necessity for operating the works with refer-ence to irrigation requirements. Periodical closures are necessary for the execution of repairs; the canal branches are operated in rotation so as to lessen loss by absorption; and in times of heavy rainfall it may be necessary to close the canal completely. All these methods of working are directly opposed to power requirements.

Over the greater part of the country there are few perennial streams, and storage reservoirs for conserving the high rainfall of the monsoon season would be necessary. In Bombay, on the eastern side of the crest of the Western Ghats, the mean rainfall is approximately 150 ins. per annum, the whole of this rainfall occurring within four months. Many of the elevated valleys of the Ghats lend themselves to the construction of storage reservoirs, and, owing to the geological conditions, a very large proportion (up to 90 per cent.) of the rainfall may be collected and stored.

The Tata Hydro-Electric Undertaking receives its water supply from three such valleys. The total catchment area is only 22 square miles, but this is sufficient to give 100,000 e.h.p. for 3,600 hours per annum.

Other projects of a similar type are under investigation in the Western Ghats. It is estimated that a continuous 300,000 e.h.p. may be obtained from the Koyna River alone; that approximately 100,000 e.h.p. may be obtained from each of the rivers Vaiturna and Kali Nadi, and about the same amount from the Andrha Valley. It is estimated that a continuous 20,000 e.h.p. is available at the Kali Nadi, Gersappa and Lushington Falls, and that, by a combined system of storage reservoirs, suitable also for irrigation purposes, a continuous 50,000 e.h.p. might be developed from this system.

The north-west corner of the United Provinces would also appear to be a promising locality for early development. There are promising sites on the Ganges, Tons, Jumna, Paisani, and Kosi Rivers, and at present the erection of a generating station on the Jumna is under consideration. It is estimated that from 40,000 to 50,000 h.p. can be easily and economically developed on the rivers Jumna and Tons, and as this region is thickly populated, there would be immediate markets for energy for the operation of cotton, rice, sugar, flour, oil, and saw-mills, and for other industrial undertakings.

There are also known to be many promising sites in the Central Provinces, and the aggregate of power should be large; but little detailed information is available.