

compared with the winter flow, a flood of 45,000 cubic feet per second being measured on the Bow River just above the confluence of the Kananaskis while a low-water flow of 500 cubic feet per second has been measured at the same point.

The rapidly increasing demand for power from the Bow River, and the necessity for providing adequate storage facilities for existing and contemplated plants on the river, rendered necessary the exhaustive investigation of the river's resources as to power capacities and regulation, and, at the same time, to enable the formation of a policy providing for the most advantageous realization of these sources in the best interests of present and prospective users both for power and irrigation. To meet these ends the Dominion Water Power Branch during the season of 1911, 1912 and 1913, instituted aggressive surveys and investigations into the power and storage possibilities of the river and watershed. These studies were compiled into a report which designates the suitable lakes and the possible improvement by their use, and further determined the feasible power sites, indicating the method of development to secure the most efficient results. The report has been published as "Water Resources Paper No. 2."

All feasible storage on the Bow River, above Calgary is, fortunately, available for the whole water stretch of the river. The mean flow for the winter months has been 720 cubic feet per second, but by means of the storage that has been, and may be, created, it is anticipated that the mean flow can be increased to about 1,500 cubic feet per second. The effect of such storage upon the power output is to raise the winter mean output of 19,785 h.p., the aggregate of the six sites, to 48,175 h.p., and in addition a plant to be constructed on the Cascade River and supplied by water in transit from the Minnewanka storage lake would be capable of producing 1,165 h.p. The Minnewanka storage system is now complete and includes a dam at the head of the Cascade River.

Three plants are now built on the Bow River. The Eau Clair development is within the limits of the city of Calgary and this had a capacity of 600 h.p., which is marketed under a city franchise.

The Horseshoe Falls plant is located about 50 miles west of Calgary at Horseshoe Falls, one of the very few concentrated falls on the river. This plant has installed two 3,750 and two 6,000 h.p. units operating on a 70-foot head and transmitting to Calgary.

The Kananaskis Falls plant is located immediately below the junction of the Kananaskis River with the Bow, about two miles above the Horseshoe Falls. The head created amounts to 70 feet, which, with the two present units, generates 11,600 h.p. This plant is in parallel with the Horseshoe Falls plant, both being owned by the Calgary Power Company.

In addition to the three plants above described the small plant at Lake Louise in connection with the Canadian Pacific Hotel at the mountain resort should not be omitted, notwithstanding its output of but 75 kw. (See *The Canadian Engineer*, December 17th, 1914.)

Four sites are available for economic development on the Bow. These are the Bow Fort site, for which a head of 66 feet operating three 4,400 h.p. units is considered the best development by the Dominion Water Power Branch engineers; the Mission, to utilize a head of 47 feet on three units of 3,500 h.p.; the Ghost site, also with three units of 3,500 h.p., on 50-foot head; and the Radnor site, with three 3,500 h.p. units at 44 feet head. All these four sites are located between the Horse-

shoe Falls and Calgary and are within short transmission distance to Calgary.

Further dealt with in considering the water powers of the Prairie Provinces are the North and South Saskatchewan Rivers which traverse the prairies and, while not having many favorable sites, include the La Colle Falls at Prince Albert and the Grand Rapids below the junction of the two rivers.

The Elbow River, one of the mountain headwaters of the South Saskatchewan, has one economical site capable of over 10,000 h.p. capacity and located but 33 miles from Calgary.

Flowing into Lake Winnipeg are numerous rivers, many of which include favorable power sites. Particularly these are the Fairford, Dauphin and the Waterhen; on the Little Saskatchewan, which flows into the Assiniboine River then into the Red and thence into Lake Winnipeg are the sites at Minnedosa and Brandon and on the Assiniboine is a site at Currie's Landing, near Brandon. On the east shore of the lake, the Rivers Manigotogan, the Bloodvein, the Pigeon, the Behrens, the Poplar, the Big Black and the Belanger are all under study from the power standpoint.

The Nelson River is very rich in water power and from the list of possible sites enumerated the aggregate for the minimum unregulated flow is over two and one-half million horse-power, while with the extensive regulation proposed for the headwater rivers this would be much increased.

The Churchill, lying even more northward than the Nelson, and flowing into Hudson Bay, promises many sites which the future will probably find playing an important role in Canadian industry.

The Athabaska, in Alberta, rises in the mountains and has occasional power sites, all of which require more or less expensive developments.

The Peace River, flowing through the 45,000,000 acres of arable land just recently made accessible for settlement, will no doubt rise to the demands for the electric power necessary in the many communities and industries bound to develop.

The Slave River drains Lake Athabaska into the Great Slave Lake and as there are some 16 miles of rapids in one stretch its investigation will no doubt reveal an excellent power site.

The MacKenzie River, flowing from the Great Slave Lake to the Arctic, is not as yet investigated from the power standpoint.

The resources of these provinces are extensive, the agricultural possibilities are famed throughout the world; the forestry products are astonishing in value, according to our conceptions of the Prairie Provinces; in coal, Alberta is the richest province in the Dominion, and in oil and gas, peat, bitumen, stone, cement and clay products, gold and iron, the real wealth is only beginning to be appreciated. The fur trade still maintains the activity of former days.

Irrigation is considered as a benefit, in general, to water power as the controlling dams and works necessary will usually offset any loss by water diversion.

The future of water power in the West requires no questioning as to its ultimate complete development. The new uses of electricity, bound to be evolved from time to time and quickly to be absorbed into the routine requirements of ordinary life, combined with the present rapidly growing power loads, will, within the period of one or two generations hence, demand the utilization of practically all the available water powers of the country.