

for any elapsed period. In other words, the user of this recorder is supplied not only with a history of the rate of flow, as, for instance, the rate at which his boilers have been fed throughout the day, but may also obtain by the use of an ordinary engine planimeter the total amount of water which has been fed to the boilers, and by comparing this quantity with the amount of coal used, may determine the total and average evaporation for the day.

Many users, however, desire to obtain the total flow directly, without the use of a planimeter, and for this purpose an integrating attachment has been added. This consists of a counting-train likewise suspended from the pen carriage, and driven by a small roller, which rests upon an aluminum clock-driven disk. When the float and cam are at the position corresponding to the zero head, this roller is at the centre of the disk, and hence receives no motion from the rotation of the latter. As the pen carriage is moved away from the zero position, the small roller is carried away the same distance from the centre of the aluminum disk, and hence is propelled at a rate corresponding to the rate of flow over the weir. The total movement of the counting train will therefore correspond to the total flow.

To meet a third requirement, a visible pointer moving along a large scale with open divisions has been added, making it possible to read the rate of flow from a distance.

All parts of the mechanism of this recorder are made to accurate dimensions by means of templates and limit gauges, the cam, for instance, being cut by an automatic machine to correspond to a master cam made of hardened steel. To be sure of the accuracy of the instrument, therefore, it is only necessary to know that it is properly adjusted; that is, when the float is at zero position; in other words, when the level of water upon which it rests is at the zero level of the weir, the cam must be at zero position, the pen on the zero line of the chart, and the integrator roller at the centre of the aluminum disk. This adjustment, particularly the adjustment of the pen to zero position, should be carried out while the entire apparatus is under working conditions, in order that contraction and expansion may be allowed for.

The method of adjustment is as follows: The water is first drawn down to zero level, as indicated by a hook-gauge, usually attached to the outside of the weir tank. When this has been done, a micrometer screw at the point of attachment of the cable to the float stem is manipulated until a zero mark on the cam stands opposite a fixed pointer. The cam is then locked in zero position by means of a pin, after which the pen is brought to the zero line of the chart by a micrometer adjustment on the pen suspension, and a similar adjustment is used for setting the integrator roller to the centre of the aluminum disk.

While originally designed for use with V-notch weirs, this Cochrane flow recorder may be used with rectangular weirs or submerged orifices. It is regularly supplied in connection with the Cochrane V-notch meters and metering heaters manufactured by the Harrison Safety Boiler Works, Philadelphia, Pa., who have supplied the information from which this article has been prepared.

The British Columbia government will co-operate with the Vancouver and Victoria branches of the Canadian Society of Civil Engineers in arranging the programme of entertainment for the occasion of the forthcoming visit in September of large numbers of eastern members of the Society.

## DEVELOPMENT OF CANADIAN PEAT BOGS.

ATTENTION is being drawn to the possibility of expansion of Canadian commerce and industry as a result of the war. This may take the form of domestic production of articles for a supply of which we have been dependent upon foreign sources, or of increased exports to other countries of products hitherto supplied by Germany and Austria.

Among other things this emphasizes the importance which development of the latent resources of Canadian peat bogs might readily assume if full advantage of the new conditions arising from the war were taken.

Sulphate of ammonia, the chief by-product of European peat plants, is a valuable fertilizer worth about \$60 per ton. The world's production last year is estimated at 1,365,000 tons, worth about \$80,000,000. The chief importing countries are as follows, the figures representing excess of consumption over production.

|                                | Tons:   | Value.       |
|--------------------------------|---------|--------------|
| United States and Canada ..... | 58,000  | \$ 3,500,000 |
| Japan .....                    | 115,000 | 7,000,000    |
| Java .....                     | 57,000  | 3,500,000    |
| France .....                   | 15,000  | 900,000      |
| Spain and Portugal .....       | 42,000  | 2,500,000    |
| Italy .....                    | 15,000  | 900,000      |
|                                | 302,000 | \$18,300,000 |

Of these amounts the portion supplied by Germany and Austria was:—

|               | Tons.   | Value.       |
|---------------|---------|--------------|
| Germany ..... | 90,000  | \$ 5,400,000 |
| Austria ..... | 30,000  | 1,800,000    |
|               | 120,000 | \$ 7,200,000 |

These figures show the existence of extensive markets which might be supplied, in part at least, by Canada, and of an opportunity to capture some share of the trade of Germany and Austria in this product.

The extent and rapid growth of the domestic market for artificial fertilizers is shown by the following statement of Canadian imports for 1902 and 1903 and the past six years.

| Year.      | Value.    | Year.      | Value.    |
|------------|-----------|------------|-----------|
| 1902 ..... | \$ 84,990 | 1903 ..... | \$112,256 |
| 1908 ..... | 403,171   | 1911 ..... | 586,453   |
| 1909 ..... | 529,660   | 1912 ..... | 620,147   |
| 1910 ..... | 548,493   | 1913 ..... | 737,656   |

Many Canadian peat bogs are rich in nitrogen, and therefore suitable for this industry, and enquiries have already been made by British capitalists with a view to establishing chemical works in Canada, provided that a sufficient supply of peat can be guaranteed.

Apart from the potential value of our peat bogs as a subsidiary source of fuel supply and for production of sulphate of ammonia, there are numerous other products such as moss litter, peat dust, alcohol, acetic acid, acetone, tar, tar oils, creosote, etc., which might form the basis of paying industries giving employment to many people, where now we have only waste lands.

In the peat bogs of Northern Holland alone it is stated that about \$3,000,000 worth of peat fuel is made yearly, and over 200,000 tons of peat moss litter. About 10,000 families are employed in the peat fields, and many pros-