Fig. 14.—The concreted dam and intake (left) feeding the corrugated iron raceway to the water wheel.

Fig. 15.—A turbine-type generator. Note the draught tube down to the base of the dam, allowing the plant to use a full head of water.

Fig. 16.—A large private power scheme in the Murchison district generating 12-15 h.p. (fall 31 ft.; flow 30 cubic feet per minute in pipeline).

but initially expensive machines, and their maintenance may be greater under some conditions than the simpler pelton wheel. Turbines, like pelton wheels, may be conveniently erected beyond harm's reach in the event of flooding, and they have the advantage that, by fitting a draught tube, the total head of water down to discharge level below the power house floor can be used.

From these brief descriptive notes it may be realised that the particular scheme and finance available will largely determine the type of power generating equipment necessary.

Dam and Intake Race Construction

As may be seen from Fig. 6, a stone-walled, earth-filled dam, constructed at the minimum of expense, is diverting stream water to the raceway outlet (Fig. 7, right) in this scheme. Concrete, while undoubtedly the most suitable building material for strength and permanence, is unfortunately expensive. Whether the dam is of logs, earth and tree-planted or stone-walled, it is wise to concrete both the spillway and the intake lead to the raceway.

The illustrated raceway (Fig. 8) was dug with the water following on behind to a depth of about 3 inches while digging progressed. No grading or setting out of levels on the hillside was therefore necessary, and when the initial grade had been found the water was blocked where it entered at the dam and the raceway channel deepened on a slightly falling grade. A fall of 1 ft. in 300 to 400 ft. is usually sufficient for this purpose (1 ft. in 396 ft. = 2 in. per chain). At the end point of this earthworks channel (Fig. 9) it was found necessary to concrete a small chamber to allow the fixing of the pipes in which the water was fed down to the power house, about 60 ft. below (Fig. 10). A metal screen to keep back sticks and other obstructing objects is necessary at the pipeline intake (Fig. 11), and with any considerable fall in the raceway an overflow pipe or channel should also be provided at this point.

In this scheme the pipes were 8 in. in diameter, the pelton wheel 3 ft. in diameter, and the output horse power 5. The pelton wheel was coupled by vee belt to the dynamo, with an overdrive on the same beltline to a locally patented oil pressure type governor. This ensured automatic control of water to the pelton wheel jet so that the voltage remained practically constant and without fluctuation throughout the range of the generator's load.

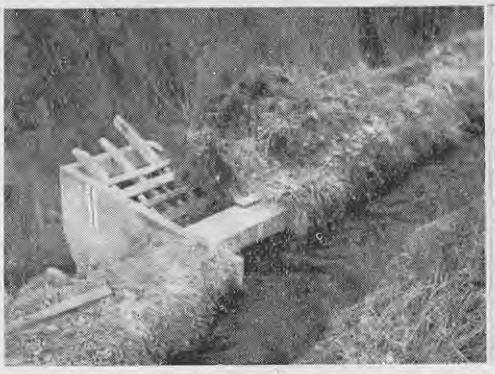

Fig. 17. — The intake and screen, showing the surplus water lead off to the right in this scheme.

Fig. 18.—The reverse view of the concreted intake.