

The £150,000 mentioned under No. 3 scheme as necessary for the eventual driving of the second diversion tunnel would also be avoided, but the £175,000 for the repairs to the falls would have to be provided for.

Placing the costs in the same order as in the previous schemes,—

|                                   | £               |
|-----------------------------------|-----------------|
| We have .. .. .                   | 375,000         |
| for new works                     |                 |
| Plus advisable .. .. .            | 60,000          |
| for improving diversion tunnel    |                 |
| Plus .. .. .                      | 175,000         |
| also approved for falls treatment |                 |
| Making a total of .. .. .         | <u>£610,000</u> |

#### SCHEME No. 5.

Scheme No. 5 involves a subterranean power-house, &c., as for No. 3, but instead of disposing of surplus and flood waters by diversion tunnels or over the existing spillway, I propose to carry the surplus water by the lined channel described in scheme No. 2. This is the scheme which probably gives the highest factor of safety, in that the power-house occupies what appears to be the strongest part of the hill, and the water standing at high level is kept away from the gorge as far as practicable, while no use is made of any of the ground which shows evidence of having been disturbed by the recent crack. P.W.D. 79661.

Putting the figures as previously—

|   | £               |
|---|-----------------|
| This scheme is estimated to cost .. .. .                          | 604,500         |
| To which must be added .. .. .                                    | 60,000          |
| desirable improvement to the diversion tunnel                     |                 |
| And .. .. .   | 175,000         |
| for the treatment of the falls already authorized and in progress |                 |
| Making a total of .. .. .   | <u>£839,500</u> |

#### SCHEME No. 6.

Scheme No. 6 involves the damming of the headrace as in the previous schemes, constructing therefrom a flume somewhat similar to that of No. 1, but dimensioned for the bare requirements of the ultimate development—in other words, for about 12,000 cusecs, but making no provision in this way for floods or surplus. Modification of the penstock-intake structure as in No. 1 would be necessary. The surplus water and floods would be dealt with by an artificial spillway as in No. 2 (see P.W.D. 79661), and placing finance in the same order as above—

|                                      | £               |
|--------------------------------------|-----------------|
| Estimated cost .. .. .               | 337,000         |
| Plus .. .. .                         | 60,000          |
| for improvements to diversion tunnel |                 |
| Plus .. .. .                         | 175,000         |
| for treatment to falls               |                 |
| Making a total of .. .. .            | <u>£572,000</u> |

#### SCHEME No. 7.

If the power-house were retained in its present position, and any one of the several possible methods of dealing with the surplus water between the power-house and the dam were adopted, we would be faced with a tail water-level during floods so high as to prevent the operation of the power-house, or at any rate to prevent the successful operation of the present machines. Modification could be introduced in future machines, but this would not be important.

The occasions when a flood of 30,000 cusecs would occur are extremely rare, in fact we have only knowledge of one such occurrence since recorded history began. If the possibility of the power-house being shut down when floods exceed, say, 25,000 cusecs, which would be extremely seldom, is recognized and allowed for, the cost of the works could be very much reduced. Assuming also that the ground between the present forebay and the power-house is not dangerously shaken, then a scheme considerably cheaper than any of those so far mentioned could be devised, and would be as follows: A new weir across the headrace as in almost all the other schemes; a minimum-sized flume as mentioned under No. 6, with the necessary modification to the penstock structure; surplus and flood waters would be dealt with as in scheme No. 3. This scheme avoids any work at the falls, but requires the immediate strengthening and refitting of the present diversion tunnel, and the providing of a start on the second, and also involves in forty or fifty years the completion of the No. 2 diversion tunnel. Thus we have—

|                            | £               |
|----------------------------|-----------------|
| Estimated cost .. .. .     | 238,000         |
| Plus in the future .. .. . | 150,000         |
| Making a total of .. .. .  | <u>£388,000</u> |