LWL, giving a direct overfall of 6 feet, as was done in the last example, the section would be still further improved.

In the plan "rough" masonry should read "rubble" masonry.

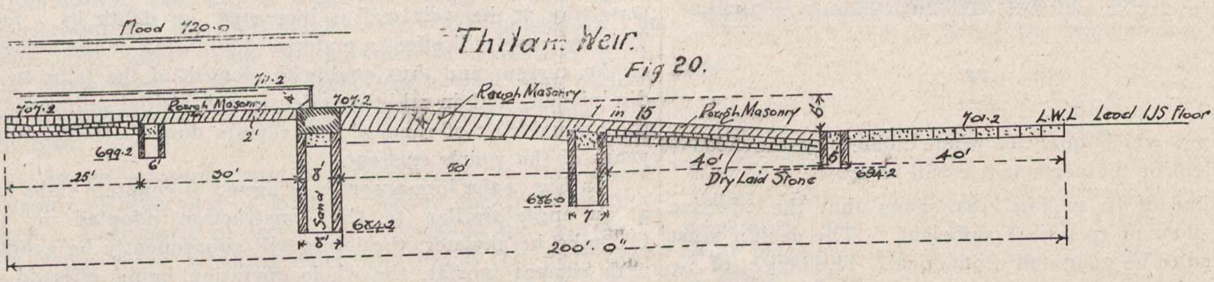
Fig. 21 is a section of the recently constructed Damietta and Rosetta subsidiary weirs across the Nile, below the Grand Barrage. The work is of Type A, with this difference, that the foundations are dredged out below LWL, as in Type B_2. The breast or core wall is carried down to a great depth in order to prevent leakage below the foundation of the old Barrage.

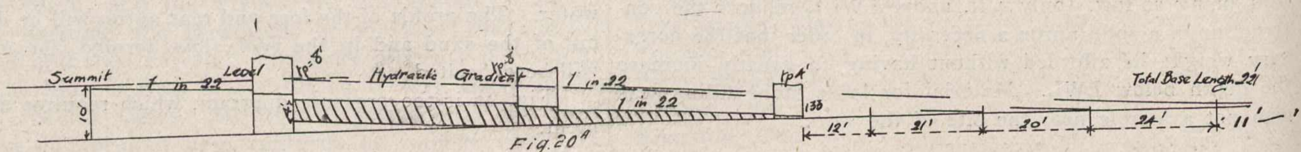
The system of dredging out the sand foundations and depositing material in the pond so formed, without pumping out the water, a peculiarity of Type B_2 entirely obviates the great delay and immense expense which are inevitable in the old system of dry construction.

The method of building the core wall by depositing loose stone filling in a wooden box, contained between a few the dredged surface line lowered from 8.00 metres to 7.50 in the middle and raised from 7.50 to 8.00 at the end, thus involving no increase of material, the section with much less superficial area would be in reality stronger than before. The objectionable fore slope of Type A, by contracting the waterway of the flood area, maintains the high velocity of passage long past the crest of the weir and thus the erosive force on the floor and talus is greater than would be the case if a direct overfall were adopted.

In Fig. 22 an alternative section is provided in Type B_2, in which, for the expensive masonry breast wall, a row of reinforced concrete sheeting piles is substituted. This it is deemed would be just as effective in stopping percolation, as well as in adding to the length of creep, as the solid wall; it is, however, a matter of doubt as to whether sheet piling is actually as effective in subsoil composed of slime, mud and quick sand, as was the case here, as a solid wall would be.

In Fig. 23 is a representation of a section of the Sidnai





temporary piles by means of floating barges and then grouting the whole with cement from the bottom upwards, is quite a novelty and provides the most invaluable precedent of efficient and rapid construction it is possible to conceive. This system of subaqueous construction is so eminently satisfactory that it is bound to supersede the old methods. The disposition of clay beneath a part of the fore-apron is also the only actual example of this kind and is a sound and economical construction. For details of this construction the reader is referred to "Irrigation," by Sir Hanbury Brown (Constable, London), a quite recent and most excellent publication.

weir in deep sand, this is simply given as an instance of a weir, the body of which is exclusively formed of clay filling, pitched on the surface, by only a thin layer of brick blocks. A point involving a matter of some importance was raised during the discussion on this paper. It is this, if the line of creep follows the contour of the vertical depressions, such as solid masonry curtain walls or sheet piling, how near can these vertical depressions be spaced? In reply, it is considered that the spacing of such curtains should be not closer than their combined depth, thus one row of sheet piling 15 feet should be 15+10=25 feet distant from another row 10 feet deep. It is clear that several rows placed in quite close proximity could

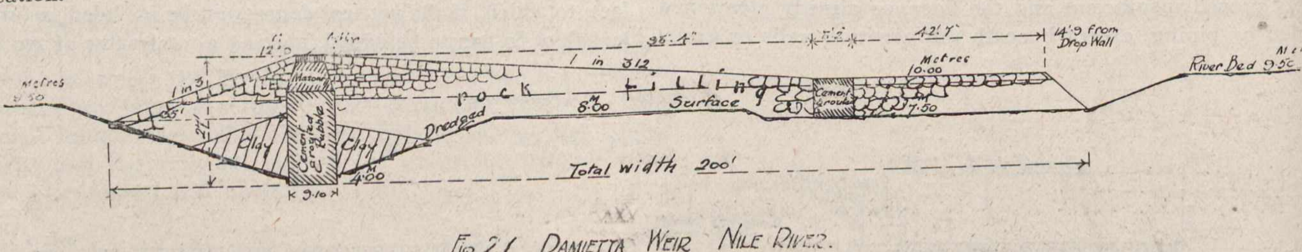


Fig. 21. Damietta Weir Nile River.

Notwithstanding these valuable innovations, the profile of the weir itself is considered to be open to the objection of being a somewhat wasteful design as regards excess of material employed. Further, as pure cement had perforce to be employed in grouting process, the cost of the masonry in the core wall must have been very high, as a proportion of nearly 40 per cent. of pure cement was used in its construction. It is believed that this drawback will at some future day be obviated by the employment of a fine sand of equal specific gravity, as admixture. Experiment showed that when ordinary sand was mixed with the cement, the grouting was not satisfactory, the materials forming separate layers owing to the varying degree of fineness and specific gravity of the ingredients of the mortar.

The main objection to be found in the profile rests in the slope given to the fore and the rear aprons. If the whole of the filling lying above RL 9.50 were bodily removed and not be effective; at the same time the fact that the course of percolation does not as a rule take the line of least resistance, i.e., cut off corner is a point that is quite accepted in the profession.

The longest weir in the world is the Dehri weir, illustrated in Fig. 12. It is 12,500 feet long.

The Dauleshwirain weir over the Godaveri River, however, runs it close with a length of 12,000 feet, while the discharge is no less than 1,210,000 second feet.

The Jobra weir over the Mahanadi, of very similar section to the Dehri weir, but 10 feet high and longer, and with 3 party walls, carries a flood discharge of 900,000 second feet with a length of 6,400 feet. The Kistna River anicut passes 736,000 second feet.

From the following table the proper safe values of the coefficients relating to l, i.e., cH can be obtained at a glance.