

facts better, the gradient is very considerably exaggerated.

"It will be noticed that the gradient rises from each end of the tunnel toward the middle, the object of which has been to provide efficient drainage from the face, and it is an instance of the prudence which has been exemplified throughout the entire work that this system was adopted from the commencement. In driving a heading forward under a mountain, it is a matter of very common occurrence that springs of water are encountered; consequently, on the ascending gradient, the water flows away by gravity from the workmen; but should the work be carried out on a descending gradient, then the water accumulates where the men are working, not only causing them inconvenience and delay, but requiring to be pumped out over the highest point of the rails. In order to prevent delay, this was done for some considerable distance; but in consequence of a hot spring being encountered at the 'face' on the Swiss side it was deemed necessary to withdraw the workmen, and the tunnel between points A and B became filled with hot water.

"Meanwhile the work on the Italian side has been pushed forward until the distance remaining to be pierced, as already mentioned, is only some two hundred and sixty yards; but a serious difficulty has arisen, as again a hot spring has been encountered, and the tempera-

ture of the rock in the advance gallery is 108 degrees F.

"The system adopted for dealing with hot springs is very ingenious, and at the same time very simple. It was at first proposed to conduct the hot water out of the tunnel through pipes, but the simpler and more efficient method, which was adopted, is to play a jet of cold water into the fissure from which the hot water is escaping, and thus to cool it down to such a degree that the workmen are not seriously incommoded; they are then able to continue the drilling and blasting.

"A channel or canal is being excavated at one side of the tunnel to carry the hot water from the spring to the outside, and this will be covered over with non-conducting material to prevent the heat rising into the tunnel.

"The question arises from whence this great heat comes, for although observations made in various wells and borings in all parts of the world give an approximate figure of one degree F. rise in temperature for each seventy feet of vertical depth, this is insufficient to account for what has been encountered, and one is driven to the conclusion that some portion of the thermal result is due to the internal heat of the earth arising from volcanic agency."

(Since this was written the great tunnel has been successfully completed.)

FRANCES E. WILLARD.

"A Dreamer and a Doer."

BY ELLA GILBERT IVES.

"Behold, a dreamer cometh?" Yes, a Seer!—  
 One who in vision rapt foresaw this wide,  
 God-smitten earth borne on resistless tide  
 Of spirit forces to the golden year;  
 A world transfigured to a luminous sphere,  
 By sun-bright deeds and natures glorified;  
 A home-like world, so fair it may abide  
 His coming—the heart-searcher's—without fear.

A dreamer? Yes, but ah! a doer, too—  
 Jeanne d'Arc of later time and fairer fame,  
 In moral realms she conquered; to the Blue  
 Her soul unfettered rose, 'mid loud acclaim:  
 "To lead a mighty host to see and do,"  
 Sang angel choirs, "behold, this dreamer came!"