# THE VARSITY

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### RONDEL.

When night descends with dusky-shadowing wings
Come all the joys that brief oblivion brings;
Respite, release from sorrow, care and pain,
Though afterwhile these ever come again,
And sleep his gracious poppied censer swings
When night descends.

Dreams haven, too, the soul from sad unrest,
(Would dreams were ever slumber's sweet behest;)
Life floats within a liquid realm of gleams
Renascent from the darkling depths of streams
Of being that flow within the human breast,
When night descends

Outside in blackness rests the weary world,
The pinions of the goddess o'er it furled,
Welcome is night's nepenthe unto all,
Though bitter be the aftertaste as gall,
If its grief is half into the darkness hurled
When night descends.

GWYN ARAUN.

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## THE UNIVERSITY AND THE PROFESSIONS.

### III.—CIVIL ENGINEERING.

The progress and triumphs of the engineering art during this Victorian age have been most remarkable. Ever since the engineers formed themselves into a society to read and discuss papers on engineering subjects, and began to publish their transactions, there has been a steady growth and improvement; the methods and the knowledge of one becomes the property of all; the inventive or creative faculty is aided and stimulated; and all in turn contribute to the advancement of a noble profession, a profession which, in the words of Telford, deals with the great sources of power in nature, and turns them to the use and service of man.

Although the Institution of Civil Engineers was formed as early as 1818, and incorporated in 1828, it was not until 1836, that they began to publish their transactions in regular form, accompanied by plans and illustrations. In these we have a full account and record of almost every engineering work of note that has been constructed during the past half century, generally from the pen of the engineer who designed it, together with the criticisms thereon by leading men in the profession—thus forming a sort of encyclopœdia of the engineering methods for overcoming the obstacles interposed by nature to the lines of travel and trade.

This institution now numbers upwards of five thousand members of all classes, and from this parent society have sprung the more recent ones of Canada and the United States. The American Society, incorporated in 1852, has upwards of one thousand members, and the Canadian Society, incorporated in 1877, has over four hundred members.

As an example of the advanced engineering of our day, the canal and lock built by the United States Government at the Sault St. Marie may be briefly mentioned. The writer has not seen any published account of it, but he has seen the work itself. Here there is a fall in these rapids varying from 18 to 19 feet in a distance of about one mile. This fall is overcome by a single lock of somewhat remarkable design. The width between the gates is sixty feet, but the gates are not placed on the same axis in the line of canal. There is a difference of twenty feet between the axis of the lower and the axis of the upper gates, the effect of which is to give a width of eighty feet to the chamber. So far as is known this is an original device, and serves to enable a tug with its tow to pass through in a single lockage, for the length of the chamber, or distance between the gates, is about five hundred feet.

The head and fall of the lock is skilfully utilized for opening and closing the gates and sluices of the lock by hydraulic pressure instead of manual labour. A small building at the foot of the lock contains the turbines fed from the canal, which maintain a pressure in the *accumulator* of some six or seven hundred pounds to the square inch —a power ever ready at hand to open and close the gates and sluices. This portion of the design is after the English practice at the great docks in Liverpool and London, only that waterpower is used in place of steam. But the boldest innovation upon the received notions of hydraulic engineers is the method adopted for filling and emptying the lock through sluices *under* the gates, instead of placing them in the lock walls, or in the gates themselves. There was a previous arrangement of this kind in the lock at Henry on the Illinois River, which is supposed to have been entirely successful. The special advantage in this case at Sault St. Marie, where the water is as clear as crystal, and the bottom is plainly visible at a depth of twenty feet, and free from rubbish of all sorts, is the rapid filling and emptying of the lock, without that dangerous swinging of the craft when the water is admitted through the gates. The sluices under the gates run along under the lock floor near two-thirds of the way towards the lower gates, and the inflowing current boils up without giving motion to the vessel, or endangering the safety of the gates. But the greatest advantage of this method is the economy of time in passing vessels. The writer timed the C. P. R. steamer making a passage two years ago, and found it occupied just thirteen minutes. To a growing trade like that which passes the "Soo" (equal now in tonnage to that which passes the Suez Canal) the quickness of a lockage is a matter of much importance.

In America, a lock of nineteen feet lift, of such large dimensions as this one, would hardly have been undertaken fifty years ago, but now that it has been tested for many years, and proved entirely satisfactory, engineers will not hesitate to work up to so good an example, and even to greater lifts when the occasion demands it. As a combination of English and American practice, this lock may be looked upon as a fine specimen of advanced hydraulic engineering.

Take just one other example of a great engineering work now in course of construction in Scotland—the Forth Bridge —designed by Sir John Fowler and Benjamin Baker, dis-