taken us for Micks and so rushed us much farther than was necessary. They apologized, however, when they discovered who we were.

Nothing was now too much to atone for their mistake. We were shown from one place to another. Fossil ferns, caves, dangerous passes, were all examined. We climbed over great boulders, and crawled on our digestive organs through small holes.

They offered to show us “places fifty per cent worse.” “For God’s sake, don’t,” said our English friend, “we have had enough.” Indeed, by this time we were all ready to see daylight once more, so we retraced our steps to the shaft, and climbed toward the ever-enlarging spot of daylight. As we emerged, one by one, we were received with laughter by the clean geologists. The lost hat, which had been recovered, and the light pants, which will never recover, were the objects of most merriment.

We washed in miners’ water, and then called our black faces clean. After taking up a collection for the miners, our English brother passed the hat, we started again after minerals. Even the deep road mud and consequent heavy wheeling seemed tame to us after our morning’s experience.

All through the day we were objects of special attention, and were dubbed “coal miners,” over and over again. On the train coming home, we were curiously scanned whenever we entered a car. Then a general smile appeared on the passengers’ faces. At last, however, we found a safe retreat on the rear platform, where we amused ourselves with the tintypes which we had taken on our return to Pawtucket. It is needless to add that we left the train at the “Know Nothing,” and did not go down to the B. & P. station.

Waxing and Waning.

The fickle moon doth change from night to night;
Its only rival is a woman’s heart.
And in them both one thing we’ll always see;
The sad face of a man doth play a part.

J. E. S.

Pumps and Pumping Machinery.

MECHANICAL means of raising and moving water or other fluids are necessary in a great variety of works, among which may be mentioned water supply, sewerage, drainage of mines, oil lines, and operations of a similar character. To meet this want we have the various kinds of pumping engines such as are in use at the present time. A brief consideration of these various forms with reference to their principal features, cost and economy in working, may merit a moment’s attention.

The various kinds may be conveniently divided into two classes: rotative or fly-wheel engines and direct acting engines. Either class of engine may be single or double acting, according as the steam is admitted on only one side or alternately on both sides of the piston. In the rotative engine the steam is cut off at a certain fraction of the stroke, while the remainder is finished by expansion, aided by the momentum of the fly wheel, thus producing greater economy of running at the expense of more intricate machinery. The direct acting engine usually allows the steam to follow the piston throughout its stroke, thus preserving greater simplicity and compactness in working parts, but less economy in operation. Both rotative and direct acting engines are sometimes made as beam engines, this being common in rotative engines. With these few elementary facts in view the principal features of the various classes may be briefly discussed.

The rotative engines are either vertical or horizontal in operation. They require expensive and massive foundations to absorb the shocks and jars incident in their working, and this is especially true of vertical engines. The expense of foundations is frequently as large as that of the engines themselves. They are the most economical working engines in the mere point of running expenses, such as fuel, but require constant attention and care, and often considerable outlay for repairs. The momentum of the fly wheel in its revolutions frequently increases to a large extent the accidents that otherwise would be trifling. The dropping of