

MECHANICS' MAGAZINE.

MONTREAL, APRIL, 1875.

ILLUSTRATIONS :

The Prestonian web perfecting printing press	97
Air-compressing machinery, St. Gothard Tunnel.....	100
The Thunderer.....	101
Ice-boat and fire-engine for 'Frosty' Harbour	105
Art in the Middle Ages	108
The Late Sir Charles Lyell.....	109
Designs in free-hand drawing.....	112
Brunton's tunnelling machine.....	113
The new French military rifle.....	116
Self-registering tide gauge.....	116
Weir's hydrogrometer.	117
Brookebank's patent railway coupling.....	120
The Westinghouse vacuum brake.....	121
Fire-brigade service at Constantinople.....	124
Towing coal-oil on Oil Creek.....	125
A cabin's shelter.....	128

CONTENTS :

Prestonian web perfecting printing press.....	97
Somerville lecture, "a adulteration of food".....	98

Tyndall on sound.....	99
Air-compressing machinery, St. Gothard Tunnel.....	102
The Thunderer.....	103
Ice-boat and fire-engine, combined.....	103
Science and art in the middle ages.....	103
Curiosities of welding.....	103
Protection for inventors.....	106
The Channel tunnel.....	110
Singing flames.....	110
Sir Charles Lyell.....	110
Free-hand drawing.....	111
Cabmen's rests.....	111
Fire-brigade service at Constantinople.....	111
The new French military rifle.....	114
Brookebank's patent railway coupling.....	114
The tides.....	115
Weir's hydrogrometer.....	115
The inventor's paradise.....	118
The Westinghouse vacuum brake.....	118
Patent cotton gunpowder.....	119
Eggs as food.....	122
Scientific News.....	123
Towing coal-oil on Oil Creek.....	126
The Roman Campaign.....	126
Miscellaneous.....	127

THE CHANNEL TUNNEL.

We have, already, frequently drawn the attention of our readers to the project of uniting the shores of England and France by a tunnel under the English Channel. This project is now every day making rapid strides towards becoming an accomplished fact, and we are now able to give our readers some idea of the manner in which the cutting of the channel is proposed to be effected. The nature of the stratum, the lower chalk, through which the boring will, in all probability be made, is such as to afford an opportunity for the mechanical boring of the entire tunnel without having recourse to blasting. An English engineer, Mr. Brunton, has, accordingly, devised the machine we illustrate on page 113. This machine, which is mounted on rails is pushed forward against the chalk which it cuts away, as it advances, with two broad disc-shaped, rapidly revolving steel knives. As the chalk falls it is caught by buckets on a revolving wheel, and by these, deposited on an endless band carried on rollers. The band carries off the cuttings and dumps them into waggons in which they are transported to the shore. The machine is in fact a large auger and it is estimated that it will be capable of boring a tunnel of the dimension required at the rate of about three to four feet an hour. It is proposed to bore a gallery at first, by this machine, of a diameter of six and a half-feet, and if the boring is successful to enlarge this gallery subsequently to its proper dimensions of about nineteen feet high and twenty-six feet broad and then brick it.

The Gardiner Mines, Cape Breton, have commenced raising coal. Twenty pairs of cutters are employed at full time.

SINGING FLAMES.

At a recent meeting of the Society of Arts in London a very interesting paper was read on a new musical instrument, the Pyrophone, in which the notes are produced by singing flames. The phenomenon is one which is well-known as occasionally and accidentally produced in ordinary gas jets. It has, moreover, been investigated to some extent by scientific men during the past few years. Professor Tyndall especially has devoted attention to it. Musical sounds are produced by a flame traversing a tube under a certain pressure, and Professor Tyndall comes to the conclusion that to render a flame musical, it is necessary that its volume should be such that it should explode in unison with the fundamental note of the tube or of one of its harmonics, and he has also called attention to the fact that, in order that a flame may sing with the maximum amount of intensity, it is necessary that it should occupy a certain position in the tube.

Mr. Kastner, the inventor of the Pyrophone, claims the merit of having shown that when two or several flames are introduced in a tube, they vibrate in unison and produce the maximum of sound when they are placed one third the length of the tube, and that if these flames are brought in contact, all sound ceases directly. By means of the latter fact Mr. Kastner has obtained control over the musical sounds produced. A very simple mechanism, in the form of a piano, has each key communicating with the supply pipes of the flames in the glass tubes. On pressing the keys the flames separate and the sound is produced, when again the pressure on the keys is removed the flames join again and the sound ceases.

An instrument may thus be constructed from one octave to a most extended compass, whose strange and beautiful tones are capable of producing the most wonderful effects. The sound of the pyrophone is said to resemble the sound of a human voice, and the sound of the Æolian harp; at the same time sweet, powerful, full of taste, and brilliant; with much roundness, accuracy, and fullness; like a human and impassioned whisper, as an echo of the inward vibrations of the soul, something mysterious and indefinable; besides, in general, possessing a character of melancholy, which seems characteristic of all natural harmonies. Among the proposed uses of this strange instrument is its taking the place of the orchestra in theatres and ball-rooms where the chandeliers besides serving the purpose of lighting will be converted into an immense musical-instrument. This will, if the invention be perfected, be a most magical result. Fancy the effect of ball-room lustres bursting into music at the will of a performer in an adjoining room who by electrical communication has perfect command over all the lights, playing on them as on the keys of a piano of almost unlimited compass.

SIR CHARLES LYELL, BART.

This eminent geologist, some of whose work is of special interest to Canadians and Americans generally, died in London, Eng., on the 22nd of February. He was born in Forfarshire, on the 14th November, 1797, and was knighted, as a mark of her Majesty's recognition of his services to the cause of knowledge, in 1848. The baronetcy was conferred upon him in 1864. Being possessed of an independent fortune he was enabled to devote his whole labour and time to the science to which he has rendered such able service. He was the first to publish a good general treatise on geology, and his "Principles," and "Elements of Geology" revised and brought up to the present condition of the science is still the favourite and most