shaft is furnished with iron appendages, shaped in a double curve somewhat like the letter S, but more open, to catch the projecting cylindrical piece on the perpendicular shaft of each stamper. This serves, with every rotation of the horizontal shaft, to lift all the stampers, one after another, a height of three or four feet; and their fall at each release, by dint of their own weight, is the force ultimately applied to the work of crushing the fragments of auriferous rock. The bottom end of the stamper is shod with a square head of iron, which acts in its descent like a paviour's rammer; and its weight may be from 40 lb. to 60 lb.

At the back of our view are the stampers above described. Through the spaces between them are seen three or four men, standing beside heaps of roughly broken stone, the quartz-rock as brought up from the mine. Immediately below the stampers are the iron boxes, one box to five stampers, open at the top, into which the men put the lumps of quartz, to be hammered, as upon a smith's anvil by the falling action of the stampers. The front of the box, at its bottom, opens with two gratings, through which the stuff, when pulverised to a thick mud (for it is mixed with water in the box) can escape to flow over the pans beneath. There is a trap door, hinged on its upper edge, suspended horizontally over the front of the box, so as to cover the two gratings when shut; and, by adjusting this door to be more or less open, the men are enabled to regulate the outflow from the box. Of the two boxes shown in the right-hand part of our engraving one is open, affording a view of its two gratings; the other has its trap-door closed. Each box, while the battery works, has a copious flow of water poured into it from behind.

The muddy substance of the crushed quartz, passing out of these boxes through the gratings in their front, descends with the water over the mercury pans, of which there are two successive series. Each pan is about 3 ft. wide, and as long as the box beneath which it extends; and the bottom of each pan is covered with pure mercury, which chemically extracts the heavy gold. These pans occupy the middle ground of the view in our illustration. The mud, escaping from the second series of mercury pans through a row of holes at the bottom of their front side as shown in the foreground, spreads itself over green baize blankets laid there. With these two or three men are seen to be more or less busied. There are several rows of blankets, and they are constantly changed for clean ones. The muddy blankets contain, in the mud with which they are saturated, a tolerable proportion of gold. They are washed and wrung out in large tubs of water. The sediment they deposit, after drawing off the clear water, is put, with a certain proportion of mercury, into a revolving drum, a barrel of some 4 ft. length and 1 ft. 6 in. in diameter. This is kept in motion during many hours. The effect of such a churning is that the mercury takes up all the remaining particles of gold. An amalgam of gold and mercury is formed, which is squeezed by hand in chamois leather, to expel the water; and the balls of this precious amalgam are then carefully deposited in the manager's iron safe, to await the remaining process, which is for separating the mercury from the gold.

It is in the retort-house, about once a week, and usually on Friday, that this process is accomplished, which they call "cleaning up." The retort-house has rather the aspect of a blacksmith's forge, with a blast furnace, but there is a large crucible place in the fire. The amalgam of gold and mercury is put into this crucible, above which ascends a funnel-shaped shaft for the evaporation of the mercury; but the metallic vapour, as it passes outside, being cooled in the pipe, is again condensed into the origiual liquid form of that metal, very little of which is lost. The gold is cast into ingots, the oblong mould of iron used for this purpose being chosen with a cavity of size adapted to the quantity of molten gold to be poured into it from the crucible. Mr. Mundy, from whom we have learnt these particulars, has seen as much as 30,000 oz., of gold produced by a single week's working, at one of the establishments in the Thames gold-fields. But there have been some occasions when still larger quantities were produced. The total yield, however, from all the gold-fields, both of New Zealand and Australia, in the year 1874, shows a considerable decrease, as compared with former years.

Mr. Howse, C. E., with a party, has gone out to explore the Cascade Range for silver and copper.

THE McGILL UNIVERSITY.

The McGill University has the honour of being the oldest in Canada proper, and the oldest but one in the Dominion—King's College, Nova Scotia, having precedence by a number of years in the date of its royal charter. McGill has also the credit of having developed its courses of study and public usefulness to a greater extent than any other of our Universities.

It numbers 38 Professors and other instructing officers, and these are distributed in three Professional Faculties or Departments as well as in the Faculty of Arts or College proper. The Faculty of Arts provides a wide and liberal course of study extending over four years. Connected with it, though constituting a separate branch, is the Department of Practical and Applied Science, including Schools of Civil Engineering, of Mining Engineering and Assaying and of Practical Chemistry. The Medical Faculty has long stood at the head of such Schools in Canada, and there is also a well equipped Faculty of Law. In addition to these branches of the University proper, the Morrin College, Quebec, as an affiliated College, sends students to the University examinations. There are in Montreal two large and flourishing affiliated Theological Colleges, the University not teaching theology directly, but affiliating with certain privileges such theological Colleges as may desire this benefit. The McGill Normal School which is the Provincial Institution for training Protestant teachers for Schools and Academies, is also affiliated to the University and under its immediate control.

The buildings of the University are plain and unpretending in exterior, but commodious and spacious, and their situation at the foot of Mount Royal with extensive grounds in front, is both beautiful and salubrious. The main building is occupied principally with the Class-rooms of the Faculty of Arts, while the Convocation Hall, Library, Museum, Laboratory and Residences occupy the wings and connecting buildings. The completion of these buildings by the erection of the West wing and the connecting buildings is due to the liberality of the late William Molson and in commemoration of which the west wing bears his name, and an inscription on a white marble slab in his honour. The Medical Faculty occupies the large detached building at one extremity, and at the other is the Observatory, which, is at present used wholly for meteorological observations, made in connection with the government system of telegraphy and storm signals. The Library now contains 12,000 volumes and is constantly being enlarged It is open under liberal conditions to citizens as well as to members of the University. The Museum is arranged with special reference to the use of students; and is especially remarkable as containing the collection of shells of Dr. P. P. Carpenter, one of the finest in its department on this continent. The apparatus is very good, and includes many of the best and most recent appliances for illustrating Physical Science. There are extensive and well-furnished chemical laboratories. The grounds in front afford space for cricket and lacrosse, and for the annual athletic sports of the students

According to the last report of the University, the number of students was 300 and there were besides 118 teachers in training in the Normal School. The University has now more than a thousand graduates in various parts of Canada, many of them occupying the highest positions in Political and Professional life.

The majority of aniline colours soluble in water furnish inks of excellent quality. Dingler's *Polytechnische Journal* of recent date gives the following practical recipes for their preparation, by which any one can make the fluids very easily:—Violet ink is obtained by dissolving one part of aniline violet blue in 300 parts of water. This ink is quite limpid, dries quickly, and gives a remarkably dark colour. It is necessary that new pens should be employed in using it, as the smallest quantity of ordinary ink mixed with it causes its alteration. Blue ink is made by dissolving one part of soluble Paris blue in 250 parts of boiling water, red ink, by dissolving one part of soluble fuchsine in 200 parts of boiling water. While ordinary inks are decomposed by numerous substances, and notably by hydrochloric acid, aniline inks are completely ineffaceable from the paper on which they are used. They resist the action of acids and even of chlorine.