EXERCISING CLUB.

This club, invented by John L. Dibble, of New York city, consists of a hollow metallic cylindrical shell, as shown in the annexed engraving. In the interior of the shell there is arranged a system of adjustable cylindrical sliding weights, by which the muscular exertion necessary to handle the clubs, may be increased or diminished to suit the power of endurance of the exerciser. Such clubs can be used by persons varying greatly in muscular strength, as by placing the weights near the hand, the power necessary to manipulate the clubs in the usual manner is much lessened, and *vice versa*. Patented in May, 1867.

THE PRESENT AND THE PAST.

NUMBER IV.

Fierce have been the contests waged among scientific men in their well-meant endeavors to assign true causes to natural phenomena. In these, as in other controversies, one side must be, on some points at least, in the wrong; while, as frequently happens, neither may be altogether in the right; and such errors, supported by great authorities, argued with surprising one-sidedness and prejudice, and too frequently interlarded with disgraceful personalities, would necessarily, it might seem, retard the advance of science. The evil, however, is most frequently brought about by too hasty generalizations upon insufficient data, and fortunately, sooner or later, corrects itself; and the accurate investigations and cautious experiments, and the acute and exhaustive criticisms, that the very acrimony of the contest calls forth, effectually winnow the truth from the falsehood, and determine the former sooner and upon a firmer basis than might otherwise have been done.

Several such contests are at the present day in progress, and notably one regarding the mode of origin of valleys. Lyell, who was very largely indebted for the groundwork of his great work, the "Principles of Geology," to Playfair's "Illustrations of Hutton," on this point discarded the older opinion that valleys were the result of atmospheric destruction and of river erosion, and substituted a theory of his own, that they were largely due to the action of the sea, operating on lines of faults, prior to the emergence of the land from its waters.

Of late years, this submarine theory has been violently attacked by many British geologists, and as energetically defended by others. The "sub-ærials" have, however, had decidedly the best of the argument; it is in vain that the "submarines" point to inland escarpments, as ancient sea-cliffs, and to many other phenomena that seem to support their cause; general principles are against them, and the logic of their own favorite facts is turned upon them.

The action of breakers does not extend to any great depth beneath the surface of the ocean, even in the heaviest gales, and all their work tends to straighten coast lines and to make even plains, and not to indent the shore or to excavate deep valleys in the bed of the sea.

Lay off upon paper a section of a sea bed as marked by soundings in its true proportions, and you will be astonished to find that the elevations and depressions of its surface are scarcely noticeable, save in very exceptional instances, and even these prove the rule; for if we find a mountain on the sea bed, it is a mass which the waves have not had time to remove, and a hollow is a pre-existing valley that they have not had time to fill up. The sea rough-hews the block and squares it off, but it is atmospheric agency and its consequents, running water and moving ice, that carve anew all the details upon the upheaved and dry land surfaces. Perhaps nowhere on the earth are such convincing proofs given of this truth, as on this continent, on either side of the Rocky Mountains.

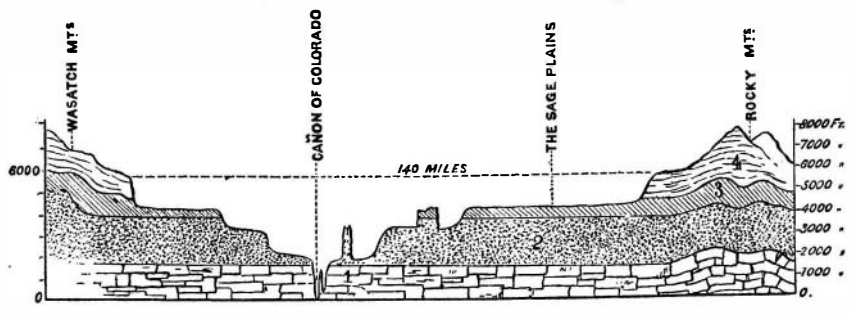
Let us confine ourselves to a few remarks upon only one district, and we shall not only elucidate this point but shall also enable the reader to recognize more clearly than ever the wondrous results that are achieved by the air, the rain drop, the rill, and the river.

The great region of the Colorado of the West and its tributaries has not been beneath the ocean since the latter laid down the cretaceous deposit; that is, it has, during the entire tertiary period, been subjected to atmospheric agencies of destruction; and if we study out the lesson afforded by the accompanying diagramatic section, given us by Dr. J. S. Newbern, the well-known geologist, of a part of this region which he explored, we may well pause astonished at the conclusions to which it points. On the line where this section is taken, crossing the junction of the Grand and Green rivers, at the head of the Grand Cañon of the Colorado, the Rocky Mountains on the east are distant some 140 miles, more or less, from the Wasatch Mountains on the west. Above this line, the cretaceous sea laid down its final loads of deposit in an even though slightly inclined plain, at what is now at the very least 6,000 feet and upwards above the level of the river's rocky bed, and fully 8,000 feet above the present sea level. In other words, when rain first began to fall upon the gradually emerging cretaceous strata, when rills first threaded their way down the slight incline, seeking the sea, the rocks which now are washed by the waters of the Colorado, were then buried under upwards of six thousand feet of newer strata. As the land gradually emerged more and more from the waves, and exposed a constantly increasing and more elevated surface to the rain fall, the rills became noisy brooks, hollowing out and widening their channels, and boisterously rolling the fragments they detached downwards, wearing them away, in their sport, to pebbles, and to sand, and to fine-grained mud; the brooks in turn became rivers, and the rivers grew more and more powerful and impetuous.

These rivers of the past cut their way into the higher rocks over which they then flowed, just as their descendants of the present are eating into their more deep-seated rocky beds; when an obstacle, such as a stratum of harder rock, for a time arrested their progress in one direction, they exerted themselves laterally, spread out their forces, widened their banks, altered their channels, but all the time kept on bearing away the millions of tuns of *débris* that the rain and the rill rolled into them. By and by the barrier gave way, their outfall was lowered, and they soon set to work on a lower and older series of rocks, while the higher plain was drained more effectually than ever; and rapid drainage of a district implies also its more rapid superficial destruction. The more steep the hill, the more bare its sides.

The brooks had settled tens of feet into the cretaceous rocks, and their channels already coursed through narrow valleys or coombs; the rivers had eaten down hundreds of feet, and their valleys had broadened into plains bounded by ever-deepening escarpments; they sank thousands of feet, and valleys had been formed within valleys, and the remains of the old valley beds were now wide plateaus bordering the new excavations. The work of the water was easier and more rapid in the more recently formed and softer cretaceous and triassic strata, than in the ancient metamorphosed and crystalline rocks, through which they are now running; and, moreover, during all the vast time that has elapsed between now and then, rain and rills have been incessantly eroding and widening the original watercourses, and bringing down more and more of the bounding escarpments. We thus see how the upper and primitive valleys (now plateaus) have been widened so much above—in places it is estimated to 180 miles; while those at present being scored out are to be measured by but hundreds of yards.

Section to illustrate the denudation of the region of the "Colorado of the West."



1. Palæozoic. **2.** Triassic. **3.** Lower Cretaceous. **4.** Upper Cretaceous.

AERIAL TEMPERATURE.—As a large portion of the traveling public is now interested in balloon voyages, it is interesting to know that the generally received opinion, that the temperature of the air decreases uniformly with increase of altitude, is a fallacy. We have Mr. Glaisher's authority for stating that the mean temperature in summer, at 50 feet from the surface of the earth, is, during evening and night, higher than at 4 feet, and in winter the same relative temperature is always preserved, both by day and night. At sunset, in summer, the temperature is nearly the same for the first 2000 feet of ascent; but at night and in winter, it increases with the altitude. Thus the phenomena observed near the earth's surface are at variance with those of the etherial atmosphere beyond.

BLACK COPPER.—The beautiful enameled surface possessed by paintings on copper, may be produced, on a black ground, by the following process: Clean the copper with sand and sulphuric acid, and then apply the following mixture: 2 parts of white arsenic, 4 parts of hydrochloric acid, 1 of sulphuric acid, and 24 of water.

KNAPP'S FLUTING AND FLAT IRON.

The annexed engraving is a representation of a combined fluting and sadiron, invented and patented August 2, 1870 by M. H. Knapp, of Fulton, N. Y. The demand for fluting irons and machines for fluting has latterly been on the increase, and this invention is designed to supply a convenient apparatus at a much cheaper rate than fluting machines can be afforded.

Fig. 1

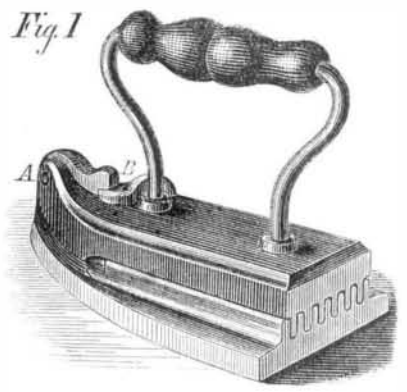
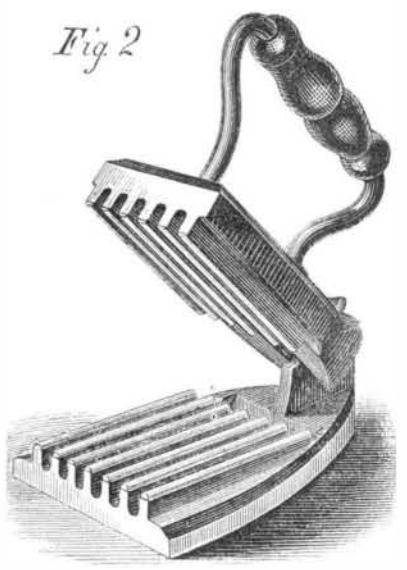


Fig. 2



It will be seen that the iron is made in two parts, pivoted together at A. When closed, these parts are held together by a button and catch, shown at B, Fig. 1. To insert the cloth for fluting, the upper part of the iron is raised, as shown in Fig. 2, and when closed, the cloth is pressed into the grooves in the lower part, and thus fluted.

For light laundry purposes this implement will answer a good purpose, and take the place of expensive machines, where rapidity in the performance of the work is not a desideratum.

Persons wanting these articles, desiring rights to manufacture, or agencies to sell them, may address for further information Knapp and York, Fulton, N. Y.

Polishing Collars and Shirts.

Put a little common white wax in your starch, say two ounces to the pound; then if you use any thin patent starch, be sure you use it warm, otherwise the wax will get cold and gritty, and spot your linen, giving it the appearance of being stained with grease: it is different with collar starch, it can be used quite cold; however, of that anon. Now then, about polishing shirts: starch the fronts and wristbands as stiff as you can. Always starch twice, that is, starch and dry, then starch again. Iron your shirt in the usual way, making the linen nice and firm, but without any attempt at a good finish; don't lift the plaits; your shirt is now ready for polishing, but you ought to have a board the same size as a common shirt board, made of hard wood, and covered with only one ply of plain cotton cloth. Put this board into the breast of your shirt, damp the front very lightly with a wet sponge, then take a polishing iron, which is flat and beveled a little at one end—polish gently with the beveled part, taking care not to drive the linen up into wave-like blisters; of course this requires a little practice, but if you are careful and persevere, in a short time you will be able to give that enamel-like finish which seems to be so much wanted.

TO DRESS COLLARS—For this purpose use the best starch, say 2 lbs., and 4 oz. of wax and 6½ pints of water; first dissolve the wax in the boiling water, take the vessel off the fire and allow it to stand for five minutes; during this time dissolve the starch in the smallest possible quantity of cold water, then pour it gradually into the vessel and boil for 25 minutes—keep stirring all the time; this starch can be used quite cold; rub it well into the collars, wring as tight as you can, finish by wringing in a cloth, then iron; thus you will have them stiff without being hard, and when well dressed will have that beautiful elastic finish so much admired in new collars.

NOT A BAD IDEA.—It is said of a shrewd merchant that he has his bill heads printed upon paper of three different colors—red, green, and white. When the bill is made out upon a red paper it denotes "danger," and the messenger is not to leave the goods without the cash; if on green paper, it means "caution," as the customer is doubtful, and the man is to get the money if he can; if on white, it is safe to leave any quantity of goods on credit.