

cision as to whether or not Canada shall be behind other countries in showing a national spirit towards the support of a Scientific and Instructive Magazine, and this important fact should be borne in mind that the information conveyed in such publications in England, France, and the United States, where such publications are nobly supported, has placed those nations far ahead of all others in arts, science, manufactures and industrial progress.

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CHINESE AND JAPAN BRONZES.

For a long time the *patina* given by the Chinese and Japanese to their bronzes has excited the admiration of Europe. The dead black especially, from which the delicate arabesques, inlaid in gold or silver, stand out, has always appeared remarkable; up to the present time, however, the method of its production has remained a secret. It is well known that in China and Japan, as there are no patent laws, various processes remain the property of a few families, and are handed down from father to son without the secret ever being made public.

The perfection to which chemical analysis has been brought at the present day makes known the secrets of Eastern nations without any inducement to have resort to stratagem for unravelling them. M. Morin, to whom were intrusted some specimens of various bronzes, submitted them to analysis, the result of which led him to form the opinion that the *patina* of black bronzes forms part of the metal, and is not due to a varnish or a superficial sulphurization, but results from the use of a bronze of rather complex nature, in which are eighty per cent. of copper, four of tin, ten of lead, two of zinc, and four of iron, gold, nickel, arsenic, and sulphur. Some of the bronzes analyzed show a portion of lead varying from ten to twenty per cent. added at the expense of the copper, and a quantity of seven per cent. of tin. Molded in very thin plates, this bronze readily takes any form given to it, and is easily worked, the *patina* appearing of itself when the finished work of art is subjected, in a muffle-furnace, to the action of a very high temperature. Unfortunately, these bronzes are very brittle, as many *virtuosi* have discovered to their cost.

Chemical analysis is, however, of little use in this case, unless it leads to synthesis. Incited by the high prices realized by black bronzes and desirous of turning to account the effects of contrast obtained by the silver or gold inlaid in a black ground, French manufacturers have made experiments on the various processes for the manufacture of bronzes like those of the East. M. Morin and MM. Christophe and Bouillet have been more fortunate than those who preceded them, having arrived at an imitation of the Japanese bronzes, if indeed they have not surpassed them, for to beauty of appearance the metal unites a strength equal to that of ordinary bronze. Starting from the principle that to be lasting and uniform a *patina* should not be a simple varnish or the result of a laying on of color, but should constitute a chemical change of the surface of the bronze; in the second place, rejecting as too fragile the lead bronzes of the Japanese to adopt the copper bronze, worked by the hammer or deposited by electro-metallurgy, the manufacturers above mentioned have presented to the *Académie des Sciences* some specimens of their work. These objects had the black, brown, red and also the green *patina* perfectly uniform; some had more than one tint on their surface, and others were inlaid with gold or silver.

The processes adopted for obtaining the ground consist of subjecting the objects to the action of chemical compounds having the oxides and sulphides of copper as their base; and the principal condition of the intensity and uniformity of tint consists not only in the choice and the purity of the substances employed, but also in the length of time occupied by the process.

If different tints be desired on the same object, it is sufficient to cover with a protecting varnish all portions of the surface except those to which it may be desired to give a certain hue; then, when this has been treated for a sufficient time, it is in turn covered with varnish while the other portions of the surface, now exposed, are subjected to the action of the chemicals, and so on for as many tints as may be required.

The inlaid enamel work which is performed by Oriental artists with so much skill and patience, and at the same time with such primitive appliances, is now executed by simpler and quicker

means. The object to be inlaid is entirely covered with varnish, portions of which are removed by a graver so as to form the design; and, thus prepared, it is subjected to the action of a galvanic bath of gold or silver, which deposits the metal in the places laid bare by the graver. Another method is, however, mentioned by M. Morin. After the removal of the varnish, according to the pattern by the graver, the object is plunged into a solution of cyanide of silver. The salt is deposited on the lines from which the varnish has been removed; the object is heated in a muffle-furnace, and the metal appears on the black *patina*. Inlaid patterns of gold and silver may be obtained, in either of their natural brightness, or with a dead surface, the latter being effected by different processes of oxidation; so that, on the same object, by making use of the protecting varnish, designs in gold and silver of various degrees of lustres may be combined.—*Jeweler, Silversmith and Watchmaker*, iv, 72.

It is said upon good authority that the chief predisposing causes of insanity are the labors, sufferings, cares, and mental anxieties of men and women who are striving to obtain an honest living by hard work.

THE BONES OF MONSTERS.

WONDERFUL DISCOVERIES IN THE SANDSTONE ROCKS OF COLORADO.

"Nature has borne strange children in her day," says Shakespeare, and he is not far wrong if we may judge from some recent discoveries in the rocks of our neighborhood. While exploring some rocks in the white sandstone hog-back of the cretaceous period, near Morrison, Bear Creek—the same stratum as at Colorado Springs, a few yards west of old Colorado City—we came suddenly upon a huge vertebra, lying at it were carved out in bas-relief on a slab of sandstone. It was so heavy that it required two men to lift it. Its circumference was thirty-three inches. We stood for some moments looking in astonishment at this prodigy, and then hunted around for more relics. Presently one of the party, a little in advance, cried out, "Why, this beats all!" At his feet lay a huge bone, resembling a Hercules war club, ten inches in diameter by two feet long. On digging beneath it a number of smaller vertebrae were discovered, and at the base of a cliff two enormous fragments, reminding one of the broken columns of some ancient temple, or a couple of saw logs lay on the ground, possible thigh bones, fifteen inches diameter at the butt end; and in the cliff above them was another fragment sticking out of the rock like the stump of a tree. With the help of a sledge-hammer and crowbar the rock was removed around it, and underneath lay some ribs three inches in diameter with other bones.

The rocks in the vicinity were full of fragments. Selecting one of these, we lifted off a large cap of sandstone above it and disclosed a perfect shoulder, *ulna* and *radius*, of another somewhat smaller animal, the thickness of the bones averaging about five or six inches. This, lying as it were like a beautiful sculpture on the sandstone, we succeeded in removing exactly as we found it. Several smaller bones of animals of various sizes were discovered, but as the sun was fast setting behind the mountains we deferred removing our trophies till the following day. During the night it snowed heavily, but next morning we succeeded in dragging our prizes on a temporary sled down the cliff to the road, and bringing home to the neighboring village a wagon load of bones and depositing them in a shanty, preparatory to packing them off East to Prof. Marsh of Yale College for identification. The monster to whom the bones belonged could not have been less than sixty or even eighty feet long. In the cliff above these bones, impressions of leaves were found (Dakota group) or dicotyledonous trees of very singular shape, some resembling a lyre, and others the leaves of the tulip tree, willow, conifers, &c. These trees grew probably on the shores of small islands in the cretaceous ocean in which the marine monsters roamed, and not far off oysters (*ostrea congesta*), clams (*inoceramus*), baculites and ammonites, and other marine shells were found in abundance.

Along the shores of this ancient sea squatted and leapt the dinosaurs or the terrible lizards, one of whom, the *loelaps*, was 24 feet long. From the length of his hinder legs, it is supposed that he was able to walk upright like a biped, carrying his head 12 feet in the air. There was another still larger, 35 feet long, and of the same habits. In the air overhead, huge bat-like creatures (*Pterodactyls*), combining a lizard, a crocodile, and a bat, flapped their leathery wings (25 feet from