

has had its share, it would be interesting to trace the inner history of the town, for there is none which comes nearer to reproducing, on a humble scale, the story of those foreign towns where the bishop ruled bodies as well as souls. But there would be little to tell of the figure Wells has made in outside happenings. It can never have been much more important than it is to-day, and when its bishops achieved national fame they played their parts at a distance.

I have spoken of those who fathered its beautiful buildings, down to Bishop Beckington. There was little left for him to add to the church itself, but his accessory works were manifold; and in the town he did so much that for generations after his death the mayor and corporation went annually in state to pray for his soul by the chantry which our ungrateful time has uprooted and defaced. Before his day there were prelates who had not been remarkable as builders only, but a more curious line succeeds him. He was followed by Oliver King (1495-1503), who was potent at court under Edward IV. and Henry VII. Next came an Italian, Hadrian de Castello, if I may use the word of one who really never came at all. He had been legate in Scotland, and after his return to Rome Archbishop Morton caused him to be named Bishop of Hereford. From this see he was transferred, still in Rome, to Wells; and in Rome he was one day asked to breakfast with the Borgia who was pope. The rest of the story is familiar, though one rarely remembers that its hero the cardinal was likewise Bishop of Bath and Wells—the story of the poisoned cup meant for Castello but drunk by the pope and his son Cæsar. Even after this Castello had no thoughts of England. He headed a conspiracy against Leo X., failed, fled, and was never heard of again. What a contrast between a wolf in shepherd's clothing like this and a Beckington or a Joceline! And the next name has still a different flavor, being the great Wolsey's. He resigned to take Durham's chair instead, and was replaced by Clerk, who carried to the pope

King Henry's "Defense of the Faith," and afterwards to the Duke of Cleves his pleasant message with regard to Queen Anne's divorce. Barlow was bishop when Mary came to the throne, fled to the Continent, and in Elizabeth's day was the first Protestant prelate at Chichester. Bourne was Mary's appointee, turned out by Elizabeth in his turn. Barkley began the unbroken Protestant line in the year 1560. Thirty years later Bishop Montague largely rebuilt the palace and Joceline's chapel, but a more famous name is Laud's. Bishop first of St. David's in Wales, and then of Bath and Wells, he passed on to London and to Canterbury. For another really noted prelate we must look ahead nearly sixty years to Ken, of whose appointment in 1685 one of the few anecdotes is told that reflect much credit on Charles II. As canon of Winchester, Ken had refused the king's request to take Nell Gwynn beneath his roof. When the see of Bath and Wells was vacant in after years Charles was asked who should fill it, and answered,—so the tale runs,—“Who but the brave little man that would not give poor Nelly a lodging?” At all events Ken's independence, no less than his simplicity, piety, and learning, were proved during every day of his episcopal life. In his time Wells for once came conspicuously before the public eye. The battle of Sedgemoor was fought only a short distance away, and Ken sheltered the refugees, and, with the Bishop of Ely, ministered to Monmouth on the scaffold. He was one of the seven bishops then tried and acquitted at Westminster, and one of the non-jurors after William and Mary came to the throne. Deprived of his see, he died in 1711 at Longleat. Bishop Kidder, who succeeded him, is chiefly remembered by the manner of his death. He was crushed in his bed by the fall of a chimney on the palace during the great storm of 1703 which wrecked the Eddystone lighthouse. In all times the bishops of Wells have frequently come from the humbler neighboring sees of Wales, and not a few of them have passed to still more exalted chairs in other parts of England.

M. G. van Rensselaer.

IN THE MARBLE HILLS.



LITTLE more than a hundred years ago the region lying to the north of Massachusetts between the Connecticut River and Lake Champlain was almost an unknown land to any but the hunter, the Indian, and the Indian fighter. Of it the world of the eighteenth century only knew that its untamed wildness had

been threaded since the old colonial days by the war-paths of Indians and Frenchmen, and out of its wide and endless forests came in slow rafts along the ancient thoroughfares of the great lake, the Richelieu, and the St. Lawrence, some mighty pines “for the masting of his Majesty's navy,” and valuable peltry of beaver and otter.

As the forests went down before the ax of



AN ORIGINAL QUARRY LOT.

the pioneers this wild corner of New England slowly grew to be an agricultural country, and for many years after it became a State it was nothing more. Except as a field for the lumberman it seemed to have no other choice; for the Green Mountains had not yet given proof that they were created for anything more than to save the State from the abominable name of "New Connecticut," nor had the rocky hills made any sign that in more than a literal sense they "held the world together."

Though the presence in Vermont of that finer limestone called marble was long ago known, and a quarry of black marble was worked in the Isle La Motte before the Revolution, any extensive quarrying of marble was not begun till within the memory of men now living. At several places in western Vermont quarries were opened years ago, but from one cause or another most of them were abandoned. Some men lost fortunes in working quarries that proved worthless, some just missed their reward by exhausting their means at the point of success, and some gained fortunes.

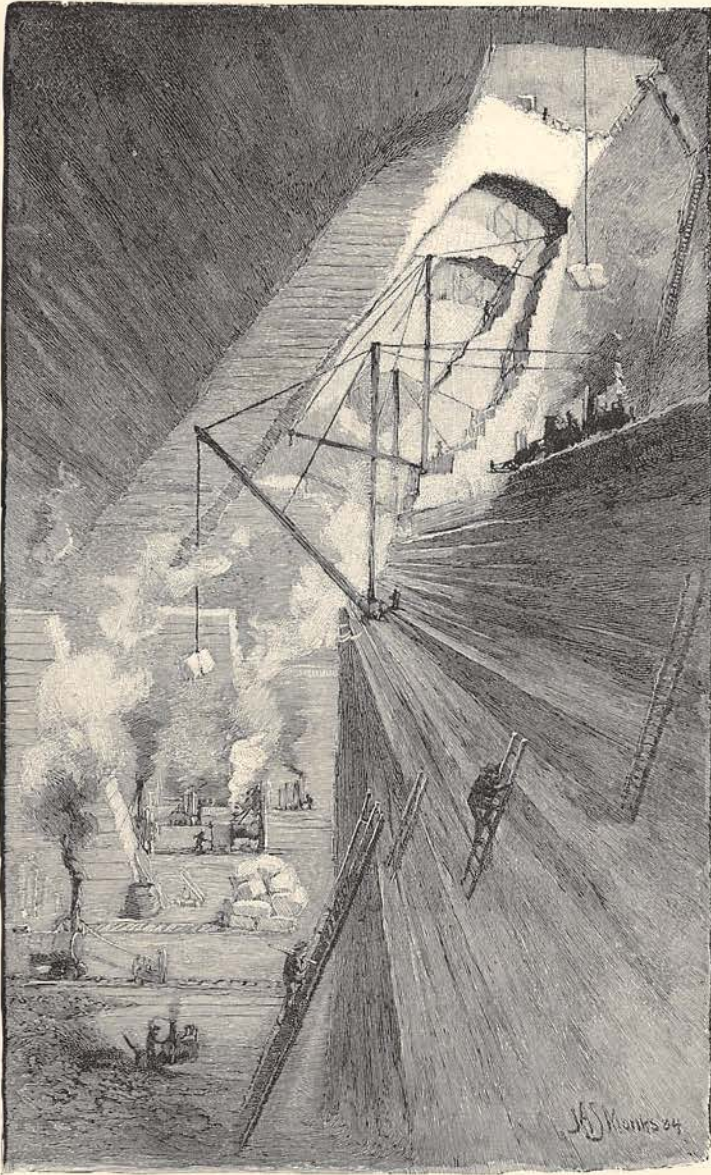
Governor Proctor (now Secretary of War) said to the tariff commission of 1882: "In this country an undeveloped marble quarry is of little value, and it is fair to say that the present value of our quarries represents what has been expended in developing them. We estimate 80 per cent. of this value as labor, 15 per cent. machinery, and 5 per cent. as marble in the ledge.

It cost from \$40,000 to \$75,000 to get the first salable marble from a Vermont quarry."

At first beds of fine, compact marble were not valued, and only easily worked white marble seemed desirable. White marble was found near trap dikes; and the numerous joints occurring there lessened the labor of quarrying, and were thought to add to the value of the quarry. Now the marble taken from such places is not esteemed, as it does not endure exposure to the weather, and is full of hidden joints or "tight cuts," at which it is apt to break.

Early in this century marble was quarried and worked in Middlebury, where, it is claimed by many of his contemporaries, the sawing of marble with strips of soft iron and sand and water was invented—or rather re-invented—by a boy named Isaac Markham. The claim is disputed by others, and all the credit given to Dr. Judd—not of inventing the method, but of introducing it at his marble works in Middlebury, since it is a well-established historical fact that this method was employed in very ancient times. Dr. Judd certainly profited most by the device, which, with improvements of his own, he applied and had in successful operation in his mill till the time of his death, in 1837.

If the boy of ten years did conceive this idea of cutting marble, it would be interesting to know what suggested it to his young mind. Was it some childish toy, or the wearing of the



IN THE QUARRY.

potholes in the rocks of the river bed by stones and sand and the rushing, whirling water of Otter Creek? Some one says he got the idea from seeing a marble worker smoothing his slabs with stone, sand, and water. Certainly he had never read of the marble-sawing of the ancients. His sister tells of his making a model, with saws of narrow strips of sheet iron placed in a gang which was propelled backward and forward by means of a crank turned with his hand, and that Dr. Judd saw this and was much interested.

Some years after the Middlebury quarry was

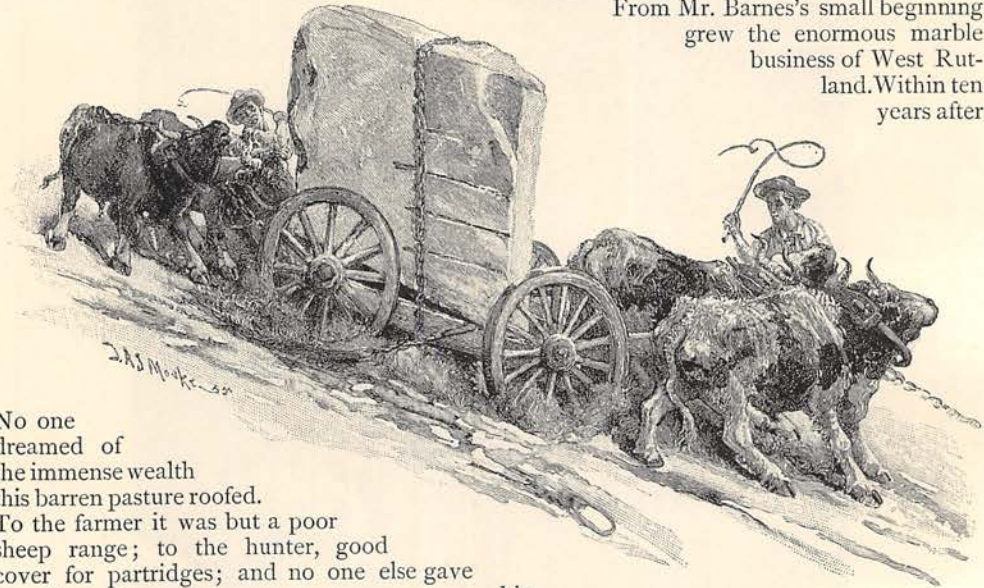
operated, a quarry was opened and worked in a small way by Goddard & Ward in West Rutland, not far from where the great quarries now are. They quarried to no great depth, and only in rude and primitive fashion, splitting out thin slabs which were chipped and smoothed into such shape as served for the unpretentious tombstones of those days. Southward, in Middletown, a quarry was opened and the marble hauled by teams over the hills to then far-away Troy and a market.

Captain Gilmore, a gentleman who was early interested in the marble business, says

that when a boy, sixty years ago, he remembers going hunting with the "hired man" over the ground where the West Rutland quarries now are. It was sterile pasture land then, overgrown with cedars, and the white ledges cropped out here and there, gleaming like patches of snow among the dark evergreens.

"push," he had not the hardness that so often goes with them; for it is told of him that when asked why he employed certain aged men whose movements were so slow and feeble that they accomplished little, he replied that they had grown old in his service, and he could not now turn them off and deprive them of their only means of livelihood.

From Mr. Barnes's small beginning grew the enormous marble business of West Rutland. Within ten years after



No one dreamed of the immense wealth this barren pasture roofed.

To the farmer it was but a poor sheep range; to the hunter, good cover for partridges; and no one else gave it a thought.

About 1836, when the sheep pasture was so cheaply valued that it was refused as security for a debt of a few hundred dollars, William F. Barnes started a kiln there for burning the marble into lime. He soon conceived the idea of manufacturing tombstones of the marble, and for a portion of the westward-sloping pasture and the adjoining swamp gave an old horse, valued at seventy-five dollars. The then oozy swamp is fertile farm land to-day; and in the hillside that day so cheaply sold now lie nearly all the West Rutland quarries, worth millions of dollars — if not a kingdom, at least a regal fortune for a horse. One can but wonder if his owner valued the horse as he ought when he came to know what he had given for him, or if he hated the poor beast with the blind hate men feel for the dumb things through which they work out their own misfortune.

Forty years later this pioneer in the marble industry, the man who unlocked this vault of treasure, found his death where he had found his fortune — killed by the falling of a block of marble in his quarry. He was a genuine Yankee, but with more love of home than is common to his race; for when, in his boyhood, his parents went to the great West, he chose rather to cast his lot in his native State. Though he had the Yankee sharpness and

his purchase of the ledge, at least three companies were organized and working quarries there. Yet for some years the business was neither large nor very profitable. There were no railroads in Vermont, and all the marble quarried had to be hauled by teams twenty-five miles to Whitehall, the nearest shipping point.

Furthermore, it was difficult to introduce American marble. People would not believe it could be so good as foreign marble; for, though its purity of color and firmness were not to be gainsaid, its durability was doubted. But the test of fifty years' exposure in this most variable and trying climate has proved the West Rutland marble superior in this quality to any foreign marble.

The advantages held by Italian over American quarrymen, in the small amount of machinery and the cheapness of their labor, is shown in the report to the tariff commission of 1882 made by Governor Redfield Proctor of the Vermont Marble Company, in Sutherland Falls and Rutland. "The marble in Italy is blasted out, tumbled down the mountain, and roughly dressed by hand and loaded on carts to be drawn to the vessels, not even

BRINGING DOWN

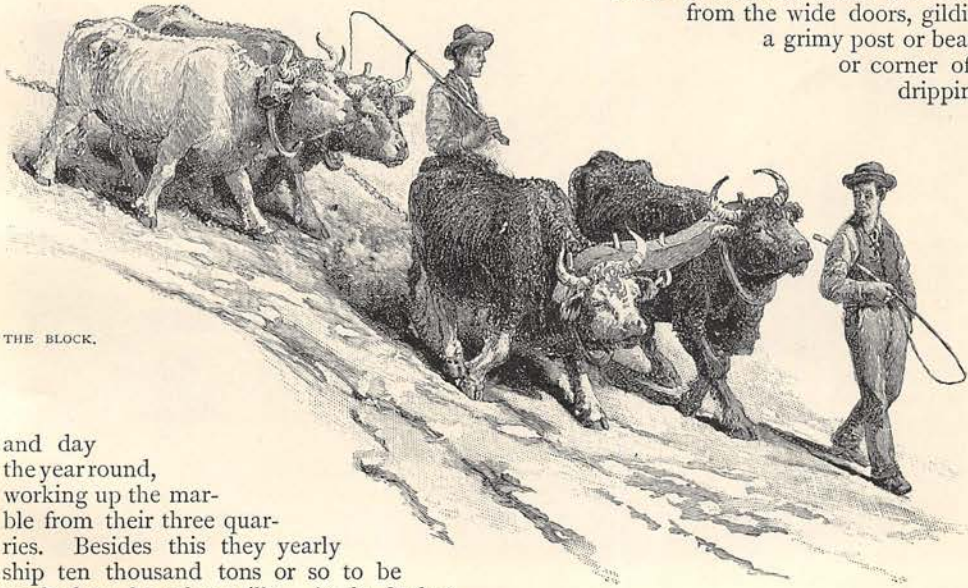
a derrick being used till it reaches the seaport. In America it is cut from the quarries entirely by machinery. Our quarries require skilled labor to manage this machinery. We pay for labor of all classes an average of \$1.75 per day. The Italian quarrymen pay less than one-third of this, and have no capital in quarrying machinery. In the Italian quarries the price of labor for the men who prepare the blocks of marble is from twenty-five to thirty-five cents a day, and of those who do the blasting forty-five cents a day. Our cheapest labor is \$1.35 a day."

In 1851 a line of railroad running near the quarries was completed, and the business began to take on something of its present proportions. A mill was built with eight gangs of saws—a wonder then, running in the daytime for nine months of the year. The same company has now forty-eight gangs of saws at West Rutland, with from eight to forty saws in each gang, running night

thin slabs by saws and sand and water is of high antiquity, and probably Oriental in its origin. Different kinds of sand were used according to the hardness of the stone, emery being used for the hardest.

In his "Natural History" (Book XXXVI., Chap. 9) this method of sawing stone is described by Pliny: "This division, though apparently effected by the aid of iron, is in reality effected by sand; the saw acting only by pressing upon the sand, within a very fine cleft in the stone as it is moved to and fro." In Chap. 6: "The most ancient instance of this practice, so far as I know, is found in the palace of Mausolus at Halicarnassus, the walls of which in brick are covered with marble of Proconesus." Thus it seems this process of sawing marble was invented more than twenty-two centuries ago.

The sawing-mill is not a cheerful place. Dampness pervades it, and under the low roof stretch the long, dim vistas, ending in gloom, between the gangs of incessantly swinging saws. The polished, shining engine is shut apart from it, and all is dull and somber, unrelieved by any touch of color, except as a bar of sunshine slants athwart it from the wide doors, gilding a grimy post or beam, or corner of a dripping,



THE BLOCK.

and day the year round, working up the marble from their three quarries. Besides this they yearly ship ten thousand tons or so to be worked up by other mills. At the Sutherland Falls mills there are sixty-three gangs of saws running day and night.

The gangs of saws—if a smooth-edged strip of soft iron may be called a saw—are worked by a mighty engine of three hundred horse power; and the teeth of the saws are furnished by sand continually piled on top of the block and washed into the kerfs by a steady drip of water from above.

Anthony says the art of cutting marble into

besmirched block of marble, or paving a bit of the earthen floor with gold, or as the red shirt of a workman flashes into the light.

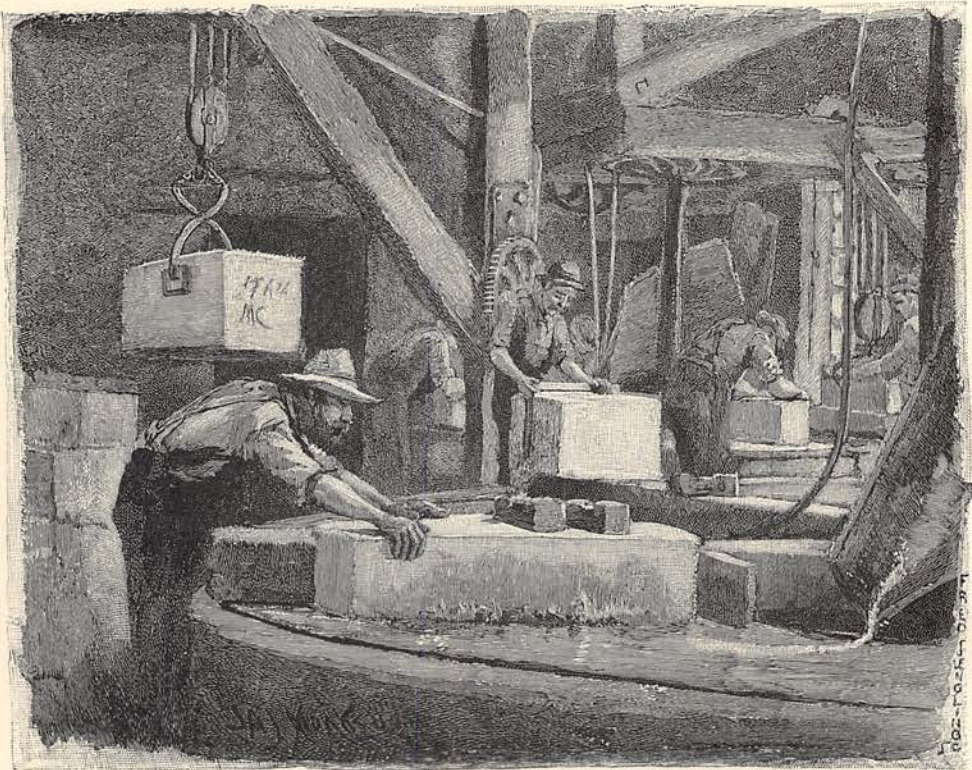
The machinery growls and hisses as it gnaws the stone like some monstrous beast in its den over its prey, and hardly another sound is heard. The lusty outdoor bawl of the ox-teamster sinks here to the pervading growl, and the whistle of his lash attunes itself to the swish of the saws.

By the earlier methods blasting was greatly employed, but the ungovernable "villainous saltpeter" spoiled many a goodly ton of valuable marble. Now gunpowder is only used for uncovering the layers of sound marble which lie under those that Father Time has been for ages working after his own destructive fashion, with frost and rain and sun for his tools.

When these are reached the blocks are channeled around with drills, and then "gadded up" by drilling in a line holes six inches or so apart, into which iron wedges are driven, sundering and raising the blocks from their bed, after that to be hoisted out with derricks. For many years this channeling was done with hand drills. Now, however, in all the large quarries there are steam channeling machines,

be marble of an inferior quality, or it may not be marble at all. The dip should be so great as to take the beds below the action of frost and sun. This is the case at West Rutland, where, in all the quarries worked for eighty rods along the westering hillside, the strike being nearly north and south, the dip is nowhere less than 25° E., while in one, at least, it plunges towards the earth's center at an angle of 85°. According to the "Report on the Geology of Vermont," published in 1861, the twelve beds then worked in the southernmost quarry had an aggregate thickness of forty-seven feet.

Each has its distinguishing characteristics; and beginning on the eastern or top layer, we find the name and thickness of each to be as follows:

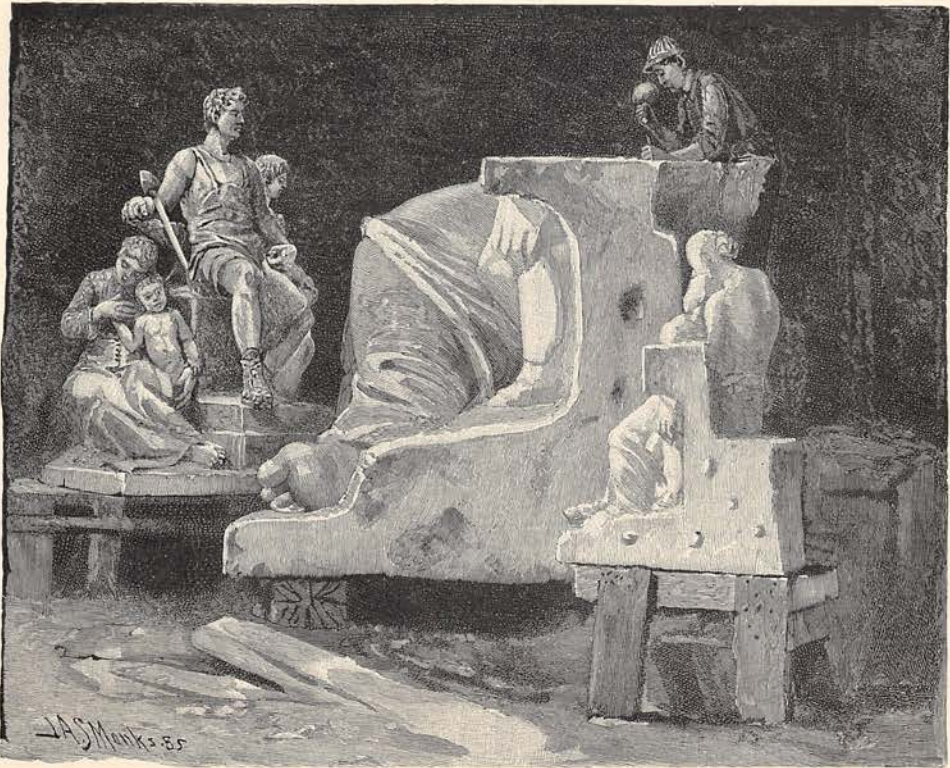


THE POLISHING BED.

biting the rock with diamond teeth, and doing the work of many men. By machines, too, much of the drilling for "gadding up" is done.

As marble of good quality is rarely found near the surface, because of the action upon it of atmospheric forces, the working of strata horizontal or nearly so at the surface seldom proves profitable; for though the outcrop may be fine marble, its exposure will have made it unsound, and the stratum beneath it may

1. Upper blue layer	.....	4 feet	thick.
2. Upper white layer	.....	3 " 6 in.	"
3. Gray limestone layer	.....	5 "	"
4. White statuary	.....	3 "	"
5. Striped	.....	1 foot 8 in.	"
6. New white	.....	4 feet	"
7. Wedged white	.....	from 8 in. to 2 "	6 in. "
8. Muddy	.....	4 "	"
9. Striped green	.....	4 "	"
10. Camphor gum	.....	3 "	"
11. White	.....	9 "	"
12. Blue	.....	3 "	"



STATUE FOR THE BOSTON POST-OFFICE.

In the other quarries the layers are of different thicknesses, bearing various names.

About the mills and quarries one frequently sees the old-time ox-teams, that in these fast modern days have almost vanished from the farm. Here they haul away cart-loads of waste and rubbish, and drag huge blocks of rough marble into the mills, or sawn slabs and cubes from them, on those rude and primitive drags known to farm-folk as stone-boats. Passing close beside a deliberate ox-team and its bawling driver comes a puffing locomotive, tugging its long train of cars up the track among the towering piles of unhewn marble. Side by side work the old and the new, each performing better than the other could its proper task.

Governor Proctor says there has been little marble exported from this country. "We have sent several shipments to London within the last two years. What was sent to London was in slabs mostly, for mantel work, tablets in walls, and so forth. But there has been no trade established there; and there is but little chance of establishing one, because they can get mantels so cheaply from Italy that it covers pretty much all the ground. America consumes as much marble as all the rest of the world together. The amount of trade is so much less in any foreign country than it is in this that

it is not worth competing for now." In a letter dated July 29, 1885, he tells me:

Our exportations are mainly to Australia. I referred to that business in the tariff commission report as of little account, but for the last two years we have sent an agent from our San Francisco branch to Australia and New Zealand, and we have got a large and very satisfactory trade in all the principal towns in those colonies. . . . We export very little marble for statuary purposes. Most of the American sculptors either reside in Italy or have their work done there, not on account of the marble, but on account of the skilled workmen; and of course they would naturally use that marble if it was as good as American. I think the best of the Italian is better for statuary that is to be kept within doors, because it is a little harder and can be cut to finer lines; but though harder than the Rutland white marble, for some cause not yet fully understood no Italian marble will stand exposure to the weather in any climate as well as the American. The Italian is about as hard as the Sutherland Falls, which is none of it white. . . . Our layers of white marble are growing harder as we go into the earth. . . . The amount of marble used for statuary purposes is very insignificant. It is of no commercial importance whatever. I presume not more than a car-load is brought into America yearly. We supply a good deal for nice work in churches, especially for the work about the altars in large Catholic cathedrals. There are in connection with these oftentimes figures and a great deal



IN THE SAWING MILL.

of work for which statuary marble is used. Mr. Mead and Mr. Powers have both expressed to me the highest opinion of Vermont marble for statuary purposes, but they must have men to do the work from their designs who have been trained to the business from youth, and they could find no such men in this country. Mr. Mead has executed some life-size statues of Vermont marble. His heroic statue of Ethan Allen in our Vermont State House is made of it.

American quarries furnish as much thin marble for furniture and mantels as do the foreign quarries. We supply more for cemetery work and an immense amount of building marble. Probably half of the total production of the country goes into building marble. "None of that," says Governor Proctor, "is brought in. That is sold here at a price that would not pay freight from Italy." The superior excellence of marble as a building stone consists in its strength and durability, its resistance to heat, and its non-absorption of water. It is also claimed by producers that building marble can now be obtained as cheaply as any other building stone. In a series of tests of building stones undertaken in the interest of the fire-insurance business Dr. Cutting found that seven varieties of marble, including all those commonly used for building purposes, are uninjured at 800 degrees. Of these, three are uninjured until the heat is sufficient to change them into quicklime, which heat must exceed 1200 degrees and be continuous for some time.

Great numbers of headstones are made here for the soldiers of the Union who fell in the late war. The stones are shaped and polished by machinery, and the lettering is done by the sand blast. Boys set the inscription on the face with metal letters fastened in place with shellac, and the miniature sand-storm rapidly cuts away the unprotected surface. In this manner the name, company, regiment, and rank of a soldier are put upon a stone in less than five minutes. Contracts have been filled by which 254,000 lettered headstones have been placed in the National cemeteries at an expense to the Government of \$864,000.

Marble is as common in Rutland as bricks and cheaper stones are in other towns. There are great shining rubbish-heaps of it about the quarries and mills, and there are roadways of it, and sidewalks flagged with broad squares of it, and floors tiled with it, till one's eyes almost tire of the sight of marble. Men carry on ordinary traffic and live common lives within marble walls, and some, it is said, think marble, and talk marble, and live on marble, till they themselves turn to stone. One such perhaps I saw, for asking some questions in a marble office that stood among the quarries, what I took to be a statue writing with a stylus of steel on tablets of stone turned its hard eyes upon me for a moment and answered me, astonishing me more by speaking at all than by the manner of the reply, which if coming from

fleshly lips might have been thought rather coldly and unwillingly given.

In the great pits, yawning wider and deeper every year, men and engines, in sunshine and in storm, delve all the seasons through. When the landscape is bright under the summer sun they may be seen, like ants toiling in their cells, hundreds of feet below the surface. Now and then an ant grows into a burly, grimy man, climbing the giddy stairs; or a small water-carrier, bearing, with careful steps, his heavy bucket to the thirsty workmen, at last becomes an ant in the moving throngs below.

In winter, when the barbaric towers of marble piled along the quarry's brink look dingy under their whiter copings of snow, such volumes of smoke and steam rise out of the caverns that more is heard than seen of the workers and their work. It is a devils' caldron, bubbling with spit of engines, clink of drills, and murmur of smothered voices. For an instant a dark form is disclosed, as if tossed upward from the seething deep; but immediately it fades away in a vapory blur and is lost. One of these gaping caverns with glittering teeth of ice, shining cold and cruel through the curling breath of panting hidden engines, might have served the old painters as a model for the jaws of death.

That out of this jagged, murky pit should come beautiful forms seems such a miracle as

the blossoming of the water-lily from the mud and ooze of a stagnant pool. As one watches the quarried blocks swung slowly up from it by the long arms of the derrick the old idea of the form imprisoned in the stone is brought to mind, and he wonders what the chisel may set free from one and another. From this clouded stone the jambs and mantel of a fireplace, or a tombstone? Shall it mark the point where human life centers, or where it finds a common, inevitable end? From that huge, rough, white cube the stern-faced warrior, or smiling girl, or gentle mother and dimpled child? One guess he may make with almost certainty of them all, that they hold in some form the idol worshiped by all mankind—the mighty dollar.

The sunset burns out behind the bristling ridges of the Taconics, and the clink of drills, champ of channeling machines, cough of engines, and shouts of teamsters cease, and there is heard only the dull rumble of machinery and the monotonous swish of saws in the mills.

The great derricks stand black and tall against the darkening sky like towering genii guarding the stony treasure that lies beneath their long, gaunt arms and giant web of iron guys. Over the scene so lately brightened by the sun and bustling with busy life steal silence, weirdness, and gloom.

Rowland E. Robinson.



ON THE SURFACE.

AN ARTIST'S LETTERS FROM JAPAN.

BY JOHN LA FARGE.

WITH PICTURE BY THE AUTHOR.

SKETCHING.



AUGUST 24.—In the afternoon I go through the little road towards the west, whose walls are spotted with mosses and creepers, and where the gutters are filled with clear, noisy torrents, echoing in answer to the general sound of waters. Rarely do I meet any one—perhaps some trousered peasant girls, drowsily leading pack-horses, or naked peasants, with muscles of yellow bronze, carrying brushwood on their backs.

The sun is at its hottest. Above the beat of the waters rises the perpetual, strident, interminable cry of the locusts, like the shrill voice of mourners in this abode of tombs—the voice of dust and aridity. I turn a corner of high wall and tall trees and enter, through a dilapidated gateway and up some high steps in the wall, an open space whose unknown borders are concealed behind the enormous trunks of cryptomeria. For weeks carpenters have been slowly repairing a temple building in this court, the big beams and planks of freshly cut wood perfuming the place