front of the first pile, where they halted with shouldered arms. In a few seconds the word for attack was given, and a rush was made towards the pile with a speed beyond conception ; and in less than one minute the whole body had passed over this immense pile, and had taken the supposed town. Each of the other piles was passed with equal rapidity at intervals of twenty minutes; after which we again returned to our former station in the market-place. Here we found his Majesty waiting for us. He anxiously inquired how I was pleased with the performance of his female soldiers, and asked if I thought the same number of Englishwomen would perform the same. I of course answered, *No*, we had no female soldiers in England ; but we had females who had individually and voluntarily equally distinguished themselves. * * * * * *

I may be permitted to make a few remarks on the army of women. It is certainly a surprising sight in an uncivilized country. I had, it is true, often heard of the king's female soldiers ; but now I have seen them, all well armed, and generally fine, strong, healthy women, and doubtless capable of enduring great fatigue. They seem to use the long Danish musket with as much ease as one of our grenadiers does his firelock, but not, of course, with the same quickness, as they are not trained to any particular exercise, but, on receiving the word, make an attack like a pack of hounds, with great swiftness. Of course they would be useless against disciplined troops, if at all approaching to the same numbers ; still their appearance is more martial than the generality of the men ; and, if undertaking a campaign, I should prefer the female to the male soldiers of this country. From all I have seen of Africa, I believe the King of Dahomey possesses an army superior to any sovereign west of the Great Desert.—*Duncan's Travels in Western Africa.*

SCIENCE AND MECHANICS.

STUCCOS AND CEMENTS.

The valuable qualities of the lime obtained from the lias formation, and known in commerce as Blue Lias Lime, requires to be known throughout the building trade. We have previously, in general terms, mentioned the peculiar uses for which it is adapted, and now transcribe from the article headed "Stucco" in the volume of miscellanies in the *Encyclopædia Metropolitana*, written by Professor T. L. Donaldson, Professor of Agriculture, University College, the additional information that seems needful, and which also refers to works where this material has been employed.

"Blue Lias is the most valuable material employed for construction in England, as it combines many of the qualities of the calcareous and of the aluminous cements. Mortar compounded of lias will always be most efficient, if kept for some time after mixture, before it is used up ; it will improve every time it is reground, or again mixed up by hand. In the ordinary mode of slacking, it is left, after calcination, when the water has been added, covered by cloths or fine sand, in order to confine the steam or vapour thrown off during the process of slaking. After lying eighteen or twenty-four hours, the lime will have fallen into a fine powder ; one gallon of water will be sufficient for one bushel of lime, and it should be sprinkled over it equally, and the heap be well moved before laying it up. If too much water be used, the lime will set instead of falling to pieces and pulverizing. It should then be passed through a fine sive, and the larger particles again subjected to the same sifting process. When blue lias is to be used by the plasterer, for rendering or stucco, it is ground in a mill and reduced to a fine powder, so as to pass through a very fine sieve, with twenty-four openings to the inch. It should lie in bins or chambers some weeks before it will be fit for use as stucco ; for if worked up fresh or hot it will at first set most quickly, but it will soon after swell, crack, and fall off. The lias, when ground, will keep good a year or two, if preserved in a dry place ; the only difference in using it then, is, that it will not set so quickly : but it will eventually become equally hard.

"For brickwork under water, or exposed to the water, one portion of lime will take only one or one and a-half of sand : but if above the water, two of sand to one of lime. Three portions of sand may be added to one of lime for the first cost, and two of sand to one of lime for the finishnig coat. For concrete, one-seventh of lime will be ample.

"For stucco, the first coat should be mixed with a course grit sand, and left rough ; the finishing coat having a fine sand ; and if intended to have a smooth surface, being worked with a covered flote ; the more labour used in the floting the better. In plain work, lias cement is as expeditious as the Sheppey cement ; but in mouldings and other elaborate work, it requires much longer time. The natural colour of the lias cement, is a fine stone tint ; it therefore does not require, as the aluminous cements, a wash ; but if after the lapse of time it may be thought necessary, it may be gone over with a wash, formed by a small quantity of the lias cement, mixed in plain water, which will readily adhere and remain ; or the outside may be rubbed and cleanse off as Portland stone.

"The principal buildings in London which have the exteriors rendered with blue lias cement, are Belgrave-square, by Mr. Basevi ; Hyde Park Gardens, by Mr. Crake ; and the Club Chambers, in Regent-street, by Mr. D. Barton. In the new rooms in the British Museum, and the interior of the Post Office, St. Martin's-le-grand ; it has also been used extensively by Sir Robert Smirke.

"The basis to the St. Katherine's Docks, on the side next the Tower of London, is faced with paviors set in blue lias mortar. As its introduction into works in the metropolis had been so recent, the men were at first not prepared for the peculiar care required by the blue lias lime in slaking, mixing, and subsequent application, which are so different from the chalk, or Medway, or Dorking lime : but after some practice they were able to prepare and use it properly, and it has been found to answer the purpose admirably."—*London Builder.*

Improvements in Boring Artesian Wells.—A Mr. James Taylor, of England, has patented an improvement which saves much of the expense of this business. In the steel, with a circular cutting edge, and the bottom closed by a valve which opens inwards. As the chisel descends by continuous percussion, the earth and stones are forced through the valve into the box, which, when full, is drawn up, and the borer again lowered. As this plan involved an enormous loss of time, in withdrawing the rods and chisel every time the box was filled, the patentee turned his attention to the devising a means for carrying up the broken strata, without so often withdrawing the rods, and has obtained a patent for a plan, which appears highly applicable for carrying out the object in view. The cutter, or borer, in the patent plan, consists of a gouge-shaped chisel, solid up to a little within the commencement of the screw, by which it is fastened by the first part of the rod. Here there is an orifice on the side, passing through the interior of the screw terminating at the top, where it is covered by a flap-valve, to prevent the return of the earth matters, which have been chipped off from beneath. The boring rods, in lengths of twelve feet each, to any distance above this chisel, are made hollow, forming a chamber for the reception of the matter passing through the beforementioned orifice ; these hollow chambers may be carried even to the surface, but the patentee recommends that they be of sufficient length to contain the produce of one day's labor at the top of which there is an orifice at the side for the discharge of air and water, as the earth matters raise in the chambers above this ; there is an arrangement termed a "slot gearing, to prevent concussion ; and above this, by the before-mentioned system of hollow chambered rods, it is found that the drawing rods may be much smaller than are usually used, even wires of moderate thickness have been found to succeed."

Force of Periodic Vibration.—Many curious instances might be mentioned of the great effects produced by periodic vibration. One of the most familiar, perhaps, is the well-known result of marching a company over a suspension bridge, when the latter, responsive to the measured step, begins to rise and fall with excessive violence, and if the marching be still continued, most probably separates into two parts. More than one accident has occurred in this way, and has led to an order that soldiers in passing these bridges must not march, but simply walk out of time. Another curious effect of vibration in destroying the cohesion of bodies, is the rupture of drinking glasses, by certain musical sounds. It is well known that most glass vessels of capacity when struck, resound with a beautifully clear musical note of invariable and indefinite pitch, which may be called the peculiar note of the vessel. Now, if a violin or other musical instrument be made to sound the same note, the vessel soon begins to respond, it is thrown into vibration, its note grows louder, and eventually it will break.—*Scientific Mechanic.*

Ballooning.—A French æronaut named Rosset, made an ascent at Bagdad last month, which excited the utmost astonishment among the spectators, totally unaccustomed to such sights. When he appeared in public he was such an object of curiosity, that the French consul was obliged to demand a detachment from the Pacha to protect the house in which he resided.—*Ibid.*

The Daguerrian Art.—It has frequently been discovered by examining well wrought Daguerreotype pictures, with the aid of powerful magnifyers, that they contain well formed and perfect representations of various minute objects which could not have been discovered by the best natural eye, in the original ; and Prof. Doppler, after many experiments and observations, gives the opinion that Daguerre's plates are 40,000 times more susceptible of impression than the human eye.

The ordinary method of hardening cast steel blades without warping them, is to dip them while hot end-wise perpendicularly in oil. But when many of the same pattern are to be tempered, each may be inserted in a thin iron case, sheath or mould ; and thus enclosed, heated and plunged into water. By this process the polish or metallic brilliancy may be also preserved.—*Scientific Mechanic.*

Electricity Universal.—Electricity is diffused through the entire mass of this globe, and of the atmosphere which surrounds it, and it may be regarded as one of the most active elements in all the works of creation. In every chemical change with which we are acquainted —in the various processions of organic life—in the mechanical movements of particles of matter—in any alteration of state, under the influences of heat or solar radiation, it is by mere contact with solid bodies electricity is developed. We marvel at its influence in directing the needle of the mariner, and we are astonished at the rapidity of its flight.—*Selected.*