Water Wheels, their Construction, Disputed Point, &c.

Messrs. Editors.—I take the liberty to address you upon a subject of great importance to millwrights and manufacturers. It is this. "What is the right way to obtain the greatest amount of power from an overshot water wheel? Whether it is by making the driving wheel nearly the same diameter as the water wheel, or by making it of the same radius of the wheel's circle of gyration. The latter plan is that which is laid down in several scientific works, while the former is the plan in general use here, where we have about 300 horse power in use, and it is almost the universal practice in Paterson, N. J. where they pay $500 per foot for water. Now either the books published, or the practice of our millwrights, is wrong. I believe the former, for as I decrease the size of the driving wheel, just in the same proportion must I decrease the size of the pinion to get a given speed to a given shaft, and of course must increase the weight on the teeth of the pinion, to exert the same power on the shaft that drives the radius spindles, or to whatever the power may be applied. I have conversed with several practical and scientific men on the subject, and I find that they disagree materially. For a 30 foot wheel the scientific men contend that the radius of the driving wheel should be about 13 feet, while the practical men say to have the radius 15 feet is equally as good, if not better. I believe that the right plan of building and applying water to wheels and communicating power therefrom, is less understood than that of steam and the steam engine.

I should like to see the following Problem stated in your useful and valuable paper and solved by some of your able correspondents, so that your numerous readers may be satisfied whether the theory or general practice is right.

Problem.—What is the difference in the power transmitted from an overshot water wheel 22 feet diameter, buckets 14 feet long, 18 inches deep from the sealing to the outer edge of bucket, with a 22 feet driving wheel, from which the power is taken, or a 16 feet driving wheel from which the power is taken, the outer wheel the same in both cases, and running 6 feet per second?

Your correspondent C. E. L. of Matteawan, in calculations on the power of the large water wheel built at the Union Works at Paterson, makes no reference to the communication of the power of the wheel, and I presume from this that he does not suppose it makes any difference in the power transmitted, if the driving wheel is nearly the same diameter as the water wheel, or several feet less, say the same radius as the radius of the circle of gyration. On that wheel the driving wheel is nearly as large in diameter as the water wheel.

Let me say that the large wheel built at the Union Works, Paterson, for Mexico, is the best piece of workmanship of the kind I ever saw put together, and would say to your friends that have water wheels to build, that the Union Works is the place to get work done as it ought to be, and at a reasonable price.

Knowing your interest in manufactures, I would state that the Company at this place finished seven thousand tons of heavy rails for the Hudson River and Utica and Syracuse Railroads last year, and are prepared to make any size and shape of iron used in the market. The company have also made about 4000 tons of pig iron since September last.

Yours, &c. G. W. E.

New Jersey Iron Works, Boonton, Morris Co. N. J.

The Ocean.

The Great Pacific Ocean has a larger area than all the dry land on the globe. It covers 50,000,000 of square miles, and 70,000,000 including the Indian Ocean. From Peru to Africa it is 16,000 miles wide. It is generally unfathomable between the tropics, where its depth is so great, that a line five miles long has in many places not reached the bottom.—The Atlantic Ocean, apparently stretching from Pole to Pole, is 5000 miles wide, and covers 25,000,000 square miles.

The German Ocean, now rapidly filling up by the detritus from the land, has in a gr t part of its bed a depth of only 93 feet! and even near the precipitous coast of Norway the depth is only 5460 feet. At a depth of a mile and a quarter the pressure of the sea is equal to 2809 lbs. on every inch of surface. In the Arctic Ocean shells are seen at the depth of 1180 feet, and among the West Indian islands at 180 feet, so that the light which fell upon these shells would have been visible to an eye at least 960 feet deep in the one case, and 360 feet in the other. The color of all water when pure is a fine bright blue, becoming green when mixed with certain vegetable matters, and brownish yellow when derived from mosses. The saltness of the sea is greatest at the parallel of 22° N. lat, and 17° S. lat., diminishing towards the Equator and the poles, where it is least, owing to the melting of the ice. At the Straits of Gibraltar the water is four times as salt at a depth of 617 fathoms, as it is at the surface.

The central area of the Pacific and the Atlantic is occupied with the great oceanic tide-wave which is raised by the joint action of the sun and moon. From this continually oscillating wave, partial waves diverge in all directions, finding their way into seas and estuaries, with various velocities, depending on the form of the coast and the depth of the channel, and the nature of its bed. In some parts of the coast of Britain the tides rise 50 or 60 feet. In the Bristol Channel and the Gulf at St. Malo they rise 47 feet, according to Captain Beechey, and at the bay of Fundy 60 feet, while at St. Helena they never exceed three feet, and are scarcely visible among many of the tropical islands in the Pacific.

The tide at the Equator follows the moon at the rate of 1000 miles an hour. In the Turury channel at Cayenne the sea rises 40 feet in five minutes, and as suddenly ebbs. The highest waves which occur at the Cape of Good Hope do not exceed 40 feet from their lowest to the highest point. Under the heaviest gales the sea is probably tranquil at the depth of 200 or 300 feet.

The tranquility of the ocean is disturbed by currents varying in their extent and velocity, owing to causes both permanent and variable. The great currents which flow from the two poles to the equator, are deflected by the diurnal motion of the earth, acquiring a rotary motion as they advance, till they combine into one great current flowing from east to west, with the velocity of nine miles per hour in some places.

Geology of Charleston, (S. C.)

A late number of Silliman's Journal has a long and able article from the pen of Prof. F. S. Holmes, entitled 'Notes on the Geology of Charleston'--from which we gather the following. That Charleston, the Capital of South Carolina, (says the author,) is built on geological formations identical in age, and in other respects similar to those upon which the great cities of *London* and *Paris* are located, is a curious fact but lately ascertained. The basin-shaped depression of its underlying calcareous and other beds, as determined in the survey just made by Professor Tuomey, occupies a considerable extent between the Savannah and Pedee Rivers, and rests upon an older group of rocks known to geologists as the Cretaceous formation. The sides of this base are estimated to be of sufficient inclination to produce those artificial fountains which are procured by boring, and known as 'Artesian Wells,' through which, by hydrostatic pressure, the water is forced up to, if not above the surface. This basin seems destined to become as famous in the eyes of the scientific world as that of Paris, from the number of new and interesting fossil remains with which it abounds, while those of them already exhumed claim for it a rank above that of the London basin. The explorations already made have brought to light portions of the bones and the grinders of the Mastodon and numerous testacea. Descending below the Post-pliocene formation where these are found, is the Eocene or lower Tertiary, the first stratum being an olive- colored peaty substance, resting upon another of sand, that separates it from the great marl-bed below. This stratum contains a quantity of water, which, in the boring of the Artesian well, rose in the tube to within six feet of the surface, and greatly obstructed the progress of the augur by filling it with quicksand.

Imbedded in the peaty substance before mentioned are numbers of rolled and water-worn rocks of all sizes, from a few inches to a foot in diameter, in which are found the same form of fossils as are seen in the great marl-bed below—whereof, doubtless, these are fragments, broken off by the action of the sea and rolled into boulder-like masses; their nature changed by chemical process, whereby nearly all the lime has been extracted, and the cast of the shells are left preserved in a silicious rock, emitting when broken a fetid odor. These strata—the cause of whose separation and separate deposit yet remain to be determined--including the first ten feet of the underlying marl, may be properly called 'Zeuglodols' or 'Basilosaurus' bed of the Charleston Basin, which Prof. Agassiz has pronounced the "richest cemetry of animal remains that he had ever seen." From it was taken the most perfect skull yet found of the wonderful gigantic fossil cetacean, and by which was determined the true character of this singular animal. Isolated teeth and bones of Basilosaurus, Dimotherium, Megatherium, Equis and nearly fifty species of Sharks, are obtained in abundance. The number of undetermined teeth and bones is considerable. Two specimens of walnuts with the epidermis converted to lignite; three casts of hickory nuts, very perfect and beautiful; and fragments of of wood (now lignite) bored by the Teredo, whose casts in marl are yet preserved, have been also obtained; and, says Prof. Holmes, at every visit something new is added to my stock.

Curious Phenomenon.

It is stated in Chambers' Journal that, on the east coast of Suez, about three hours' ride from Tor, in Sinai; there is a sandstone ridge at one part of which where it is about one hundred and fifty feet high, there is a steep acclivity named Kakuh, having much loose sand laid against it, the produce of the upper part of the hill. When the traveller ascends this sandy cliff, his ears are saluted with a sound which at first resembles the tone of an Æolian harp, then that of a humming top, and finally becomes so loud that the earth seems to shake.

After many speculations about the cause of this phenomenon, the matter was set at rest by the distinguished naturalist, Ehrenberg. "He ascended from the base of the hill, over its cover of sand, to the summit, where he observed the sand continually renewed by the weathering of the rock, convinced himself that the motion of the sand was the cause of the sound. Every step he and his companion took caused a partial sound occasioned by the sand set in motion, and differing only in continuance and intensity from that heard afterwards, when the continued ascent had set loose a greater quantity of sand. Beginning with a soft rustling, it passed gradually into a humming noise, and at length into a threatening of such violence that it could only be compared with a distance cannonade, had it been more continued and uniform. As the sand gradually settled again, the noise also gradually ceased." Mr. James Prinsep, who also inquired into these sounds, states that the effect is produced by "a republication of impulse, setting air in vibration in a focus of echo." It is, in short, a phenomenon in acoustics.

Courtesy.

Shall courtesy be done only to the rich, and only by the rich? In good breeding, which differs, if at all, from high-breeding, only as it gracefully remembers the rights of others rather than gracefully insists on its own rights, I discern no special connection with wealth and birth; but rather that it lies in human nature itself, and is due from all men toward all men. Of a truth, were your schoolmaster at his post, and worth any thing when there, this, with so much else, would be reformed. Nay, each man were then also his neighbor's schoolmaster; till at length a rude visaged, unmannered peasant could no more be met with, than a peasant unacquainted with botanical physiology, or who felt not that the clod he broke was created in Heaven.—Carlyle.

Great Sea Fight.

The following is an account of a wonderful sea fight, taken from a late Dublin Paper:

Capt Rochefort, of the British and Irish Company's screw vessel Rose, arrived yesterday morning from London, and reported having on his passage fallen in with a whale of huge dimensions, on Sunday morning, at two o'clock, seven miles S. W. of the Lizard.—This monster of the deep was suffering severely at the time in an encounter with two well known enemies of his tribe—a sword fish and a thresher. These formidable creatures generally go together through the waters, and are reputed to be joined in a league of unrelenting enmity against the cetaceous animals.—Capt. Rochefort and his crew saw the combat for about three quarters of an hour; but, being obliged to continue their voyage homewards, they had to forego the pleasure of witnessing the struggle to its close, and of taking in tow to Dublin the body of the vanquished whale, for of his being eventually worsted in the affray there was no doubt. The sword fish was seen once driving his tremendous weapon into the belly of his victim, as he turned on his side in agony. The thresher fastened on his back, and gave him some terrific blows which were heard at a distance with great distinctness. The latter not having any power to strike in the water, it was the instinctive policy of the sword fish to make the attack from below; this causing the whale to rise above the surface, which he did at times to a remarkable height; the other assailant which was about twenty feet long, then dealt out his blows unsparingly, with all the force of his lengthy frame—between them their victim suffered extremely; he spouted blood to an immense height, and crimsoned the sea all around to a considerable distance. Being within two hundred yards of the ship towards which the whale appeared to make for protection, the conflict was distinctly visible to all on board. It is considered unusual for marine animals, such as were engaged in the struggle now narrated, to be seen in such a latitude. But this point must be settled by naturalists.

Nankin.

Most, if not all, the nankin now sold in our markets, is of American fabric. It is manufactured from nankin cotton, grown in Georgia, and is spun and woven at the Lonsdale Mills, in Rhode Island. The culture of nankin cotton was introduced to this country by the late John Forsyth, formerly minister to Spain, afterwards Secretary of State, under the administrations of General Jackson and Martin Van Buren. It is now grown in large quantities by many of the planters of Georgia, and commands a ready sale at high prices.

Mr. Forsyth procured the seed from the American Consul at Canton and, at the outset, the project of growing it in this country was deemed wild and chimerical. It is of a darker hue than the China article, and not as handsome.

Variety and Vividness of Colors in Flowers.

The petals of flowers, do not owe their beauty to the color that paints them, for that when drawn off, is dull and dead; neither do they owe their brilliant tints to the skin that covers them. Their lovely appearance is derived chiefly from the bubbles of water which compose their pabulum. Receiving the sun's rays they are enlivened and brightened by reflection and refraction from those drops of water, and from that spot or point of light being seen in every bubble, and striking to the focus underneath. By these means the whole flower would at times be one blaze of light, had not nature, to soften the same covered the petal with an upper and under skin which curtails their diamond-like rays, and leaves them instead a lightness and beauty unequalled by the most exquisite art of the painter.

The Locality of Editors.

The Newark Mercury "means something" when it says, to tell where editors are staying see in their papers what "place" is noticed as "the most fashionable summer resort," and "just the thing for this oppressive weather," with "accommodations unsurpassed," and "charges moderate."