

The Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY

At No. 37 Park Row (Park Building), New York.

O. D. MUNN, S. H. WALES, A. E. BEACH.

TERMS—Three Dollars per annum—One Dollar in advance, for four months.
Single copies of the paper are on sale at the office of publication, and at all periodical stores in the United States and Canada.
Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.
See Prospectus on last page. No traveling agents employed.

VOL. VIII, NO. 14... [NEW SERIES]... Nineteenth Year.

NEW YORK, SATURDAY, APRIL 4, 1863.

THE NECESSITY FOR BODILY EXERCISE.

The human body is a wonderful machine. Viewed automatically it demands our fullest admiration for the manner in which it performs its various functions. Man is an automaton; he is one not only in habit, but also in thought; he is too apt to do as he sees other people doing. It is the usage of our people to drink in public to a greater or less extent; it has become a standing joke against us that, when friend meets friend, the invariable habit is to repair to the nearest bar and imbibe. Man smokes; he was not born to smoke, he adopted the practice; through sorest pain and direct physical disturbance, he was inducted into the art of drawing in the fumes of tobacco, and then puffing them out again, this also is done automatically; mechanically; when reading, thinking, traveling, or—what not?

It is not the normal condition of the animal, man, that he should smoke, drink, or do any other foolish thing; if he will do it, however, he ought to repair the damage to his frame and morality as speedily as possible. This he can do, first, by abstaining from the source of disease; and secondly, by the aid of moderate exercise, strengthen the impaired forces of the body. Man's brain was given him for a divine purpose; it was not merely intended as a sentinel to warn him when he was drinking or eating to excess; when either of these practices obtain, the seat of the mental power is undermined, reason totters, and man becomes a fool. The brain partakes of the condition of the body. Are the digestive functions in good order and the other parts of the frame in like condition? Then the thinking organs are not dormant but active, they are not feeble but strong.

Inaction rusts out the body. Torpidity resolves muscle into flabbiness, and bone into a chalky structure without integrity or value. Lazy men are generally flaccid, vapid, insipid to the last degree; vigorous exercise would do them good; and one is tempted to apply a slight pedal impetus to their exhausted frames, in the hope of doing them some lasting benefit.

If our assertions are correct, then the necessity of exercise, in some shape, is fully apparent, and he who neglects his future health at the expense of present comfort, inflicts an injury, irreparable in after years. Gymnasiums exist in every large city, and if they are not convenient, saws and axes are; all other things being equal, these are perhaps even better than a solemn and set way of invigorating the feeble organization by stated periods of jumping or pulling. The patient in pursuit of health destroyed by sedentary practices or bad habits, derives but little benefit from mere physical activity, unless his brain enter into the spirit of it also. All the forces of the body are naturally enfeebled by dwelling too long on one subject; they have run in the ruts of thought or the channels of trade until suddenly the vitality is impaired, the brain becomes feeble and powerless, and the once able writer or sound thinker is a comparative cipher. There can be no more melancholy spectacle than that of an invalid in pursuit of health under difficulties, solemnly, even morosely as it appears, lifting a huge dumb-bell with his mind dwelling the while upon some point of law or some question of profit and loss. No! no!

let us have no such mockery of exercise as this; throw care to the dogs, and go to the regeneration of the wasted functions with a will; let us recuperate the exhausted forces as if it were a pleasure and not a pain. Run off the track, mentally, if you wish to be healthy; relax the toil of thought, unbend the austere brow, freighted with wisdom and wrinkles. We know some very excellent men, who, although not compelled, perform the so-called menial offices about their houses; they bring coal, they split wood, they draw water; and when they draw it, they are dipping all unconsciously from the fabled fountains of health which Ponce De Leon sought so long and unavailingly. The inference is not that if Ponce had split wood, &c., he would have found the spring of perpetual youth which he desired; but that the means of assisting nature to reproduce that wonderful organization, the human body, exist on every side.

"Jonathan" is reproachfully designated as a lazy fellow, and not without some show of reason. He rides in cars, he lolls in rocking-chairs, and he has stuffed sofas on which to recline after he comes home from the weary and consuming exertion of sitting in a chair down town all day. Let "Jonathan" get up and walk more—as much as his English cousins do, and he will have thicker legs and a better and more graceful anatomy generally. "John Bull" is, to speak mildly, given to ponderosity in front; his is not an elegant figure, but he is healthy and hale; and we think a little more attention given to daily exercise would result beneficially on our vigor as a nation.

USEFUL INFORMATION ABOUT BOILERS.

The "Association for the Prevention of Steam Boiler Explosions," in Manchester, England, through its Chief Engineer, Mr. L. E. Fletcher, publishes monthly and annual reports of a most valuable character to all who make and use steam boilers. Its last annual report has been published nearly in full by the *Mechanics' Magazine* and *The Engineer* (London), and from these we condense the following:—

One of the most fruitful sources of fracture in boilers is the unequal expansion and contraction of their different parts on account of the various temperatures, which are caused in many cases, though not in all, by imperfect circulation of the water. Grooving manifests itself in the double-flued boilers at the tube angle-irons and end plates, more especially at the furnace mouth, and it is more active in proportion as the end plates are rigidly stayed. In no class of boilers is this action so destructive as that in which the furnace tubes are brought so close together that there is not room for the angle iron at either end of the flue to be carried completely round them, and which, therefore, requires to be supplemented with a saddle-plate, which, with its complement of the two partial angle-iron hoops, forms a "spectacle piece." These saddle-pieces are found to wear in grooves so deeply that in some cases the whole thickness of the plate is eaten through. Channeling is also frequent at the transverse seams at the bottom of the shell of internally-fired boilers. Boilers with two furnaces running into a single oval flue, containing a number of vertical water tubes, have the advantage of a more rapid circulation of the water; this is calculated to prevent transverse channeling at the ring seams and grooving at the angle irons. Corrosion is found to be going on in all boilers. A fruitful source of this evil is found in the leakage of blow-out pipes, at their attachment to the shell. Boilers are also subject to very rapid exterior corrosion where they come in contact with damp brick-work. Internal corrosion arises in many cases from acidity in the water. When this is the case corrosion may be prevented by the use of carbonate of soda. One firm in Manchester, having several 50-horse-power boilers, use half a pound of the carbonate of soda in each per day. This neutralizes the acidity of the water and has been found beneficial. It is added in small doses and may be fed in by the feed pump. Incrustations in boilers are great evils. A partial remedy has been adopted in marine boilers by frequent blowing out at the surface. The scum which rises on the surface of the water is then discharged through a suitable pipe. In most cases the use of a moderate quantity of the carbonate of soda, combined with blowing out the boiler at the sur-

face, will prevent incrustations. Surface-condensers, however, afford the most radical prevention of incrustation in all boilers. The condensed steam is pure distilled water, and as it is used over and over again in the boilers of engines which have surface condensers, no incrustations can be formed in them.

During the year 1862, thirty boiler explosions occurred in Great Britain, by which eighty-seven persons lost their lives and eighty-nine were injured. Of these thirty explosions eleven occurred to externally-fired boilers, from failure of the plates that were directly exposed to the action of the fire, three resulted from internal corrosion, three from external corrosion, four were due to improper construction, one to shortness of water, and another to accumulated pressure of steam for want of a safety valve; this was the boiler of a kitchen range. Particulars as to the causes of the other seven explosions were not obtained.

In the Manchester district surface blowing-out in boilers has made considerable progress, and the use of the steam jacket for cylinders has been revived. With respect to its utility Mr. Fletcher says:—"The steam jacket has, in combination with the use of highly-heated steam, been the principal element in the attainment of that economy for which the Cornish engine has long since been notorious." Surface blowing-out of the boiler, surface condensation of the steam in condensers, and superheating are due to marine-engineering practice; these changes have developed higher economic results.

PRESENT CONDITION OF THE "ROANOKE."

The iron-clad steam battery, *Roanoke*, is rapidly approaching completion, and it is thought that steam will be applied by the 1st of April. The turrets are nearly finished and the pilot-houses are already completed. The smoke-stacks are in place, as are also the guns and miscellaneous fixtures generally. Her armament will be one 15-inch gun and one rifled 200-pound Parrot gun in the forward turret; one 11-inch gun and one 15-inch gun in the midship turret, one 11-inch gun and one rifled 200-pound Parrott gun in the after tower.

Down "below" all things are rapidly assuming an appearance of order and system. The ship is literally full of steam engines, there being no less than twenty-two of all shapes, sizes and varieties on board of her—trunk, oscillating, horizontal and vertical engines—each and every kind are here represented and have some special duty assigned them. Those who are fond of statistics might employ a few hours by figuring up the amount of horse-power contained in the steam machinery on the *Roanoke*; the result would be interesting. The ship draws but 20 feet of water forward, at the present time, and will have to be brought down lower to use her ram effectually. She is very little submerged with the present load.

NUT LATHES.

In our walks through machine-shops the idea has frequently occurred to us that it would very much expedite the work and economize the time if lathes were made solely for turning and facing up nuts. There may be some such tools in existence, but in all our experience we have never met with them. They ought to be made so as to face both sides at once; this can be done with two tools; the only difficulty is to hold the nut, but this trouble can be removed, we think, by our inventors. Quantities of nuts are now made, we are told, by firms who manufacture solely for the trade, and if finished nuts could be bought readily by our machinists, of a standard size and thread, they would fill a great desideratum. The process of turning nuts now is accomplished, by boys, very cheaply; but if the same boy could do twice or three times the work he now does, the nuts would of course be cheaper still.

LOCOMOTIVES.—We learn from the Poughkeepsie (N. Y.) *Eagle* that there are sixty-five locomotives in use on the Hudson River Railroad; thirty-two of them running between that city and New York, and thirty-three between that city and Albany. Thirty-five of them are coal-burners, twenty-nine wood-burners and one a hard-coal-burner. Estimating the price of each locomotive at eight thousand dollars, it would foot up five hundred and twenty thousand dollars invested in locomotives by one company.