

is on tolerably safe ground, but in the very next sentence falls into that extraordinary blunder which affects the otherwise supple mind of intelligent America. "Who paid them?" is the next question asked in his politico-economical "Cock Robin." The planters! "Who paid the charges on the cotton until it reached its final consumer? The planter; whose share of the two, three or five dollars a pound paid for his cotton by his customers in Brazil, Australia or California, amounted to but a single dime." This is, perhaps, the most tremendous statements ever made by any writer in any country on any subject. The planter did none of the things ascribed to his agency by Mr. Carey. Not the producer, but the distant Brazilian, Australian or Californian really paid the high prices to which the raw cotton of the planter was ultimately raised. This error of Mr. Carey's completely explains the confusion of his mind on the subject of free trade. It is the consumer who "pays the piper," whether that musician take the shape of a shipowner, a manufacturer or an almost prohibitive duty. This truth, which was made sun-clear a third of a century ago, has not yet dawned upon the American protectionist. The imposition of a high rate of duty is not "taxing the foreigner." Far from it. Nobody but the ultimate consumer suffers. Custom-houses take their share—merchants, commission agents and capitalists, who advance gold to pay duties with, taking a handsome profit on the duty—the whole of which falls with crushing weight upon the shoulders of the last buyer. So far as can be gathered from Mr. Carey's extraordinary pamphlet, that country is the best off which consumes its own productions, for that seems to be the meaning of "bringing consumers and producers into near connection with each other." On this principle, China and Japan were once eminently happy countries, for they sufficed to themselves and suffered no stranger within their gates. Steam, also, has done little to improve the condition of the world, and especially of the English people, who are not to be compared with the egg-farmers of France! But we fear to weary our readers with a recapitulation of Mr. Carey's worn-out fallacies. These ancient arguments were, we had fancied, "hung up for monuments," for they sound in modern ears like the clash of antique armour.

BREAKING DOWN.—Men often have their hands full, are overcrowded with business and drive hurriedly along at it, but they may not be overworked. We cannot always tell when we are overworked. A man does not always know himself, no more than he knows the strain on the mainspring of his watch that will break it. But there comes a time when it breaks—a click, a snap, and the watch stops. Men break down in this way. They go on, day after day, the pressure being harder each successive day, until the vital force gives out, and the machine stops. It is a great pity that the indications of this state of things cannot be seen beforehand, and if seen, regarded. It is one of the last things that men will admit to themselves, much less to others. They flatter themselves that it is only a little weariness of the flesh, which will pass off with a few hours' rest, when in fact, every nerve, power and resource is exhausted, and the system is driven to work by sheer force of the will. When the oil on the shaft or in the oil box is exhausted, every revolution of the wheel wears on the revolving part, and soon will ruin it. The same is true of the human body.—*American Manufacturer.*

EFFECT OF THE SEASONS ON THE BODY.—The curious fact has recently been pointed out by Dr. B. W. Richardson that the changes of the seasons have a patent physical influence upon the body. Some years ago, in a convict establishment in England, a number of men were confined amid surroundings (of clothing, room, food, etc.) practically the same for each individual. The medical superintendent of the jail undertook investigations, extended over some nine years, and during which over 4,000 individuals were weighed. It was found that during the months of winter the body wastes, the loss of weight varying in increasing ratio; that during summer the body gains, the gain varying in an increasing ratio; and that the changes from gain to loss and from loss to gain are abrupt, and take place, the first at the beginning of September, and the second at the beginning of April. This is shown in the following figures, indicating the ratio of loss or gain: Loss: January 0.14, February 0.24, March 0.95. Gain: April 0.03, May 6.01, June 0.52, July 6.08, August 0.70. Loss: September 0.21, October 0.10, November (exception) a slight gain, December 0.03.

COMBINED AGRICULTURAL LOCOMOTIVE AND REAPING MACHINE.

(See page 261.)

CONSTRUCTED BY MESSRS. AVELING AND PORTER, ENGINEERS, ROCHESTER.

The agricultural locomotive steam engine having been successfully adapted to the work of ploughing, thrashing, and hauling, it some time ago appeared to Mr. Thomas Aveling, of the well-known firm of Aveling and Porter, of Rochester, that it would be advantageous if its services could be further utilised by its application to reaping and mowing, and the arrangement of which we annex an engraving, and which is to be exhibited next week at Birmingham meeting of the Royal Society of England, has been designed with a view to carry out this object. Mr. Aveling, having had many opportunities of practically working the various reaping machines invented and manufactured since the year 1851, when American reaping machines were first introduced in a practical form, has selected the well-known reaper invented by the Rev. Patrick Bell, a minister in Fifeshire, in the year 1826. This reaper was awarded a prize of 50*l.* in 1829 by the Highland Agricultural Society, but from some cause remained almost forgotten until 1852, when a competition took place at the Highland Society's show at Perth. Mr. Bell, having improved and put his old machine into thorough repair, then competed successfully with the American manual black-delivery-machine of Mr. Hussey. The superiority of Mr. Bell's machine, with self-acting delivery clear of the horse track, over one which required men to remove the corn to enable the horses to pass, was so evident that the judges unanimously awarded the prize to Mr. Bell's machine.

The manufacture of this machine was subsequently undertaken by the well-known firm of Messrs. W. Crosskill and Sons; but it has not come largely into use, its weight, heavy draught, price, and the peculiarities of propulsion and steering having, it appears, counterbalanced its numerous advantages. With the employment of steam power instead of horses, however, these objections become of minor importance, and altogether the machine is admirably adapted for the purpose to which M. Aveling has applied it.

The machine now under our notice, and shown in our engraving, is capable of clearing a space of 12 ft. in width, and delivering the cut corn to either side in swathes sufficiently large that sheaves can be gathered without a rake. Motion is communicated from the engine by means of a pitch chain driven from the crank shaft end, the liability to slip on the part of the carrying wheels of the horse machine being thus avoided, and the reciprocating motion of the knife at a proper speed being secured. The machine is connected to the engine by means of two angle iron bars secured to the frame of the reaper. A bolt passing through the ends and through the smokebox, enables the reaper to be lifted by means of the crane clear of the uncut crop when the machine is turned at the end of the field. When thus lifted the engine can also readily carry the reaper from one position to another.

The engine is an eight horse-power agricultural locomotive of Messrs. Aveling and Porter's ordinary type, fitted with a crane, and it can be steered and managed by one man. Such an engine is adapted for all descriptions of farm work. The engine, like all those lately made by Messrs. Aveling and Porter, has the bearings of the crankshaft, countershaft, and driving axle carried by the side plates of the firebox casing, these plates being extended upwards and backwards for this purpose. The whole combination of engine and reaping machine is well worked out, and it is one which we consider possesses great promise.—*Engineer.*

TAR WALKS.—A correspondent recommends the following mode for making tarred walks: First gravel the walk in the ordinary way, but do not give it so thick a coat as usual; beat well down to make a perfectly smooth and even surface, which coat well with tar. When this is done put the final layer of gravel on the top, three-quarters of an inch to one inch will be quite sufficient, and again beat down, using the back of a spade for the purpose. The walk so prepared must not be trodden upon for two or three days, and the end of which time it will have become perfectly hard, and will not be affected by the heaviest fall of rain. The work must be done in fine weather, and the plan will be found better than using cement mixed with gravel.—*English Mechanic.*