of no value, or they will have nothing to spend for those finer pleasures which are so much better and more enduring. There has been of late years, we are glad to say, a considerable advance in this respect among the workingmen, as seen especially in their increased attention to music, art, and to the cultivation of flowers; but a vast deal more remains to be done to raise the amusements and recreations of the laboring class to the standard required by a cultivated taste.

But the most important source of happiness of a cheap yet elevated kind is to be found in reading, affording as it does both amusement and instruction; and whoever can lead workingmen to a better practice in this regard will render them an inestimable service. A taste for reading, indeed, is even now rapidly spreading among the better portion of the working class, and this is in itself an encouraging sign; but the reading is often so low in quality, so little able to amuse or to instruct, that the benefit obtained from it is but trifling in comparison with what it ought to be. Workingmen read the newspapers, and thus become familiar, to a certain extent, with the course of affairs throughout the world; but the quality of the newspapers they often read shows at once the poorness of their literary taste and the meagerness of their information. Besides the newspapers, their principal reading is fiction, and this rarely of the best; while of the vast stores of information, historical, biographical, scientific, and other kinds, which English literature contains, their knowledge is in general of the most meager sort. Yet the majority of working people have abundant time and energy for the prosecution of such reading, and only need to form a taste for it in order to obtain a pleasure of the noblest kind.

Finally, the working classes can secure a great addition to their present enjoyments by cultivating among themselves a more refined society and gentler manners. There has been already a noticeable improvement in this respect among our native workingmen especially, and the manners of many of them will now compare favorably with those of the business classes; though it must be added that the manners of the business classes themselves admit of no little improvement. But among a certain portion of the working class, very abundant in the city of New York, manners seem to be an unknown art, while society, in any proper sense of the term, would appear to be an impossibility. Yet there is no good reason why the manners of working people should not be refined and agreeable; and with better manners and the wider information and quickened intelligence that would come by better and more extended reading, the working people might do much to improve their social surroundings.

We have thus noted some of the ways in which working people can, if they will, obtain a far higher order of happiness than they now enjoy, with little or no increase of expense. Some of the pleasures which the rich man enjoys are and must remain beyond their reach; the spacious halls, the costly furnishings, the expensive journeys and other pleasures which only wealth can afford, can never be theirs, and it is vain to sigh for the unattainable. But the pleasure and improvement that come from reading can be cheaply obtained by means of circulating libraries; many refined amusements cost little more than vulgar ones do, while the pleasure that comes from good manners and good society can be had without any expense at all. When we compare the life of an ordinary mechanic with that of a country clergyman who earns but little more; when we see the latter with his books, his universal interests, and his refined society; the former with few books, and those not of the best, with his vulgar amusements, and his unsatisfying society, it seems too obvious to need pointing out that what the working classes most need is not to get more money, but to learn how to get more happiness by means of the money they now have.

OPEN LETTERS.

A Study of Sea-sickness.

WHEN a landsman perambulates the hurricane deck during his first few days at sea, his feet come down upon the deck with a force and emphasis quite in contrast with the quiet glide of an experienced seaman. This stamping upon the deck means that, in addition to the five senses commonly known, there is also a muscular sense, which is one of the most important of them all. Through the influence of this sense, as one walks under accustomed conditions, he directs the muscles engaged in walking in a manner almost automatic, and the nervous supply to the muscles engaged in the act of locomotion is quite exactly proportioned to the amount of muscular force demanded. But if the conditions are unfamiliar; if, for instance, the surface beneath the feet rises and falls in an irregular and quite unexpected manner, there is too much nervous stimulus applied to one group of muscles and too little to another, and hence the muscular contractions are too great in one direction and too little in another. First, then, one foot comes down with an excessive muscular impulse, against a rising deck; then, the muscular sense giving alarm, an insufficient impulse is given to the other, which is now approaching a receding surface, and it fails to reach the deck by the muscular action of stepping, and the weight of the body coming upon that side, forces the foot down by gravitation; hence, one step is a stamp and the other a fall. All this is perplexing and disappointing to the nerves engaged in the act of locomotion, and the nervous centers which control the muscular impulses are irritated and exhausted.

Every one remembers having in the darkness made muscular preparation to step up or down where no step existed, and how this disappointed muscular action was accompanied by both mental and physical perturbation; how the face was flushed, the heart palpitated, and the breath came rapidly. This, on a different scale, is what happens at almost every step to the novice on the steamer's deck. It is not remarkable that such a series of little nervous shocks should react upon the nervous centers, and induce disturbance of circulation or revulsion of the digestive organs.

While the function of locomotion is by no means the

most important one in inducing the nervous disturbance of sea-sickness, it is an important element, especially during the first few days of ship life. This fact may be verified by any one susceptible to sea-sickness who will leave the deck or saloon, where walking or sitting may be accompanied with little inconvenience, and pass along one of the narrow passages leading between the rows of state-rooms. One who can traverse the deck with courageous defiance of sea-sickness, will, in the narrow passage, often turn pale, and experience a most unpleasant weakening of the knees. The reason is that, in making one's way along the narrow passage, there is an earnest endeavor to keep the body in uniform relation to the sides of the passage. On deck, however, the steps are directed in devious ways, and the body sways freely from side to side. Hence, on deck there is much less restraint and tension, and therefore fewer muscular disappointments.

But it is known that one may sit quietly in a steamer chair or lie in a state-room and still experience all the horrors of *nausea marina*. Another source of nervous perplexity, then, of no small consequence, will be found in the inclination to breathe synchronously with the swing of the vessel. We are all familiar with the instinctive act of making long and full inspirations and expirations as one rises and falls in a swing. If the ship's motions were only in one direction, and if they were uniform in time, they would produce in one sitting on the deck, or reclining in a berth, the same agreeable effect as the swinging of a hammock on shore; but unfortunately there are too many elements of disturbance in the rhythm of the ship's movements to react in such an agreeable manner.

It is not during the storm, when mountain waves lift the prow of the vessel now high in the air, and now plunge it as though it were steered for the ocean's bed, that sea-sickness most prevails. It is the chopping sea after the storm that conquers the stomach of even the weather-worn sea-farer. One may look across the deck of a ship from side to side, and beyond to the horizon, in such a way as to mark the motion of the vessel as it rolls. Perhaps it will be found that with each roll the ship's side rises and falls through a space of ten or more feet, yet the motion is so agreeable that no one on board is sick, and none but those who are watching even think that there is a roll. But if, an hour later, the ship has entered a chop sea, caused by a change of wind or a current, the ship's roll may be less than half what it was before, but more than half the people on board are thinking of their stomachs. The unenviable notoriety of the English Channel, as a region where the stoutest knees tremble and the ruddiest faces grow pale, arises not from any superiority in the height of waves, but from their unequal character. When the ship rolls regularly, once in so many seconds, the people breathe regularly; but when the ship's motions lose uniformity, the irregularity in performing the function would be a sufficient cause for general nervous disturbance.

Many years ago, Dr. Darwin, in stating his views of sea-sickness, declared that disturbance of the visual function was the cause of the trouble. His opponents, however, met him with the statement that a blind person could be sea-sick, and as Dr. Darwin could not gainsay the fact, his theory was not considered sound, and it practically dropped out of sight. There was, nevertheless, more truth in Darwin's view than his opponents were willing to concede. He was correct in his opinion that visual disturbance could produce sea-sickness. But as comparatively little attention had at that time been directed to the muscular adjustments of the eyes, it did not occur to him that muscular confusion in adjusting the eyes, or other organs, would bring about the nervous reactions which he was considering.

When the eyes are directed to an object they are automatically adjusted, not only in their focus individually, but in their relations to each other, so that the most perfect image may be obtained, not only in each eye, but in corresponding parts of the retinæ of the two eyes; thus not only is each eye adjusted to the object, but a stereoscopic effect is produced. These various adjustments are performed through the instrumentality of a series of muscular contractions, and hence the act of looking at an objcct is an exceedingly complicated one, bringing into play many muscles and nerves. When one is upon the solid land and changes his gaze from one object to another, the adjustment is completed in harmony with the movements of all the other muscles of the body, and with the experience of the individual. The adjustments are, in an emphatic degree, automatic; and if the changes are not too sudden or unusual, the sensation is agreeable. On shipboard, however, the relation of objects to the eyes is constantly changing. If the changes were uniform, the ocular muscles and nerves would soon accustom themselves to the new state of things, and act regularly and with ease. Owing, however, to the constantly varying relations of things at sea, this complicated system of muscles is in an unceasing state of perplexity. Many persons will experience a sensation of discomfort, and even nausea, when looking at a curtain or scenic fixture at a theater if a current of air causes either to fluctuate in an unsteady or unexpected way.

It is this perplexity of ocular muscles which renders the state-room the most unpleasant part of the ship to the sea-sick subject. On deck or in the large saloons, the eyes, being directed to distant objects, are adjusted with comparative ease. In the state-room, however, all objects are seen at close range, and the acts of accommodation, and of corresponding movements of the eyes, must be sharply and quickly performed. Hence, in the act of dressing, when one looks at articles of wardrobe, at buttons and other small things, and especially when one looks in the little state-room mirror, the head swims, the face loses color, and nausea quickly supervenes.

No other examples need be adduced to show that sea-sickness is a direct result of muscular disappointments and nervous perplexities, arising from the unaccustomed efforts to regulate certain functions with respect to the novel and extremely unsettled state of things on the ship.

Accepting this proposition, we are in position to inquire what can be done to mitigate or prevent the evil. Sea-sickness, probably, can never be abolished; but it is not unreasonable to expect that its effect and duration can be greatly modified. In considering preventives, attention should be first directed to general conditions and precautions. From what has already been said, it is evident that sea travelers are subjected to very unusual demands upon their nervous energies. Hence, advantage should be taken of every circum-

stance calculated to increase the nervous power, and everything tending to depress it should be strictly avoided. Abundance of oxygen in the lungs, a cheerful state of mind, and sufficient physical exercise, all tend to an increase of nervous power; while a vitiated atmosphere, a despondent state of mind, and the use of improper foods or the improper use of drugs, tend to depress the nervous forces. No drug will prevent sea-sickness, except so far as it acts by blunting or destroying nervous susceptibilities. Most people who cross the ocean do it in the hope of renewing and increasing their store of nervous energies. Nothing could be more illogical than to commence this process by depressing the nervous functions by the use of stupefying drugs. It may, under extreme circumstances, be better to use a medicine for temporary relief than to suffer from excessive nausea, or from those other forms of sea-sickness, headache, dyspepsia, or diarrhea; and it is proper that one should be provided with a small quantity of bromide of ammonium, which is the most effectual means of temporary relief to nausea or headache, and with such medicine as may be needed to arrest serious disturbance of the digestive organs. These should be used only as occasion absolutely demands, and not as preventives.

Again, the diet on shipboard should correspond as nearly as possible with what the individual has been accustomed to at home. Many persons take wine on shipboard as a preventive of sea-sickness. If one is accustomed to wine at dinner when on shore, the fact of being on the ship is not a reason for changing the habit; but if one is at home an abstainer, he would be much better off without wine on the voyage than with it. Champagne is extremely liable to induce dyspepsia at sea, and is often mischievous in its influence. The same may be said of lemons and of other acids which are sometimes recommended.

Another precept which should be earnestly impressed upon every person who goes to sea is, that no one, merely on account of sea-sickness, should keep the state-room during the day. No matter how severe the illness induced by the vessel, the traveler should leave the stifling air of the state-room, and inhale the fresh breeze upon the deck, if the weather permits; or, at least, in bad weather, enjoy such freedom of breathing and of movement as may be obtained in the saloons.

In regard to the function of locomotion, the sooner the muscular sense of the feet and legs is educated the better. The mental and muscular exhilaration incidental to walking, running, or dancing upon the deck, will more than compensate for the disturbance caused by the difficulties of locomotion at first experienced. The most deplorably sea-sick individual can leave the steamer chair long enough to take a run from one end of the ship to the other, and the excursion will repay the effort, which should be renewed at least every hour or two of the most disconsolate day of the voyage. But in short trips, as in crossing the English Channel, the more completely the locomotive faculties are suspended, the less disagreeable will it be for the individual.

Strict attention should be directed to the state of the respiration. Many a threatened sickness may be averted by drawing a few deep, full inspirations at regular and rather rapid intervals. One who is overtaken by sea-sickness, while lying quietly in the berth in the darkness of night, may be quite sure that he or she is breathing in the same unsteady manner in which the ship is moved upon the water. If the sufferer, at the first premonition of sickness, would rouse sufficiently to attend properly and earnestly to the breathing process, it is probable that the nausea would pass away as suddenly as it came. Under all circumstances, then, the breathing should be strictly dissociated from the motions of the ship. By attention to this precept for a short time, varying from one to three or four days in different individuals, the respiratory acts will become quite independent of external influences, and will be carried on in the accustomed and regular manner, without further thought on the part of the traveler.

It would seem less easy to regulate the function of vision at sea, yet much may be accomplished in this direction, and as in the case of breathing, after some attention during the early part of a voyage, the function will be managed without an effort of will. When on deck, the view should be directed to the distant sea. When reclining in the steamer chair, one should look at the clouds, or the horizon, and in walking the gaze should not be fixed upon the objects passed. In conversation, the eyes should not be directed to the face of the person conversed with. In the state-room, the eyes may be directed indifferently about the place, and while dressing and undressing they may be closed, except when it is necessary to find an article wanted. The greatest difficulty will be experienced at the tables in the dining saloon. The popular idea that the almost universal desertion of the tables during two or three of the early days of the voyage is owing to the odor of food, is largely a mistake. The great source of trouble is, that at the table one looks at plates and dishes intently, and for a considerable time, at very short range. The act of seeing, under the circumstances, demands, for perfect vision, that all the muscles of the eyes shall be on the alert, and at this short range the greatest tension is demanded. The perpetual changing of relative distances from the eyes of the articles upon the table, renders each new adjustment unsatisfactory as soon as it is made. But the function of adjustment may be so suspended that objects will be seen only in the most vague and indistinct manner. By thus suspending the faculty of accommodation at table, one may go through a meal scarcely seeing any object with greater clearness of vision than is absolutely necessary for finding the articles needed.

It is supposed that young children are less susceptible than grown persons to nausea at sea. An explanation is found in the fact that there exists in them a much higher degree of muscular adaptability and flexibility of tissues. Especially in children is the function of accommodation of the eyes accomplished with far greater ease than in adults. On the other hand, aged persons enjoy comparative immunity from sea-sickness, though in this respect they are less fortunate than children. In the old, the function of accommodation of the eyes is usually so completely suspended that they make less effort in that direction, and hence experience fewer disappointments from that cause. Those persons who have weak or disproportioned ocular muscles may find greater trouble in managing the accommodation of the eyes than others, and in those

cases the susceptibility to sea-sickness may be greater than usual, and may continue even after considerable experience at sea. On the contrary, if the muscular insufficiencies are so great that it is impossible for the eyes to act together, there may be little irritation arising from the visual function.

Sea-sickness, then, is the result of reflex irritations arising from little surprises to the muscles, and shocks to the nerves engaged in performing certain important functions,—notably of locomotion, respiration, and vision,—and when the groups of muscles thus engaged are once educated to the surrounding circumstances, the nervous revulsions are not experienced. Proper attention to the exercise of these functions may so far mitigate the trouble as to make it rather an inconvenience than a distressing illness. Let it be distinctly understood that medicines can only prevent sea-sickness by inducing nervous insensibility, and that such a stupefying process is directly opposed to the object of the voyage when this is undertaken for the promotion of health. Every article of diet likely to disturb the digestive organs should be avoided, and an abundant supply of oxygen should be inhaled. The feet should be educated, the respiration regulated, and the vision restricted. If close attention is given to these directions, little fear of serious sickness need be apprehended; and a voyage which might otherwise be remembered with the most disagreeable associations may be rendered a season of almost uninterrupted enjoyment

George T. Stevens.

Free Trade with Canada.

IT seems to me strange that the question of an American zollverein was not brought prominently before the Tariff Commission. The people of the United States have been so educated to a belief in protection that it would be folly for any political party to work seriously for free trade or a tariff for revenue only, but a change might, perhaps, be made which, while seemingly a concession to the free-traders, would in reality strengthen the protective character of the tariff. A protective tariff should be a discriminating tariff, so arranged as to shut off the competition of strong manufacturing nations, while encouraging trade with countries likely to afford a market for manufactured products. The United States have nothing to fear from the competition of Canada or Mexico, and free trade with them would give American manufactures a greatly extended field. American capitalists are now interesting themselves in the development of Mexico, and a great deal of attention has been paid, of late, to the resources of that country; but the prevailing feeling with regard to Canada is one of indifference, occasioned by ignorance of its resources.

To the average American, the name of Canada calls to mind a narrow strip of inhospitable country lying to the north-east of the United States, and inhabited by an unprogressive people. It is now, in fact, the name for the whole of British North America, extending from the Atlantic to the Pacific,—a territory almost as large as the whole of Europe, rich in minerals, and possessing the finest fisheries and the largest area of land adapted to the production of first-class wheat in the world. The most fertile part of Canada lies in the north-west, although the crop reports for 1882 show a higher yield of wheat per acre in Ontario than in any of the American states. Over the whole of the Canadian north-west territory, formerly known as the Hudson Bay territory, from the American boundary, line forty-nine, to latitude sixty degrees, the same flora prevails, and there is little difference in the climate, although it becomes warmer toward the west on account of the Chinook breezes which come through the passes of the Rockies and cause a rise of sixty degrees in the temperature in a few hours. The valley of the Peace river, twelve hundred miles north-west of Winnipeg, is said to have a finer climate than Manitoba. In explanation of this uniformity of temperature in such a wide range of latitude, Professor Macoun says: "It was long ago asserted as a principle by geologists, that land in quantity situated to the southward of latitude forty degrees north, very materially raises the temperature of lands lying to the north of such parallel." He gives meteorological tables showing that there is almost no variation in the temperature between forty-nine and sixty degrees, and that the climate compares favorably with that of European countries in the same latitudes.

Almost the whole of this vast territory will yield from twenty-eight to forty bushels of wheat per acre. United States Consul Taylor, who has made a study of the Canadian north-west for years, has gained for himself the nickname of Saskatchewan Taylor, on account of his praises of the section of country bordering on the Saskatchewan river. He says three-fourths of the wheat producing area of North America lies within the Dominion of Canada. The Canadian Pacific Railway is being pushed through to British Columbia with an energy almost unparalleled in railway construction; and during the last three years, Manitoba has been filling up with settlers almost as rapidly as the Western States did in their most progressive days. Already a prosperous trade has grown up between this part of Canada and the cities of the eastern provinces, Winnipeg alone purchasing $12,000,000 worth of goods from them last year. As Manitoba and the north-west territory become thickly settled, and the wonderful resources of Canada's most western province, British Columbia, are developed, this trade will grow to enormous proportions. At present, most of the settlers are Canadians and Europeans, but the time will come when the stream of migrants from the Eastern States will be diverted to this region, and then, unless free trade prevails, the United States will experience what Canada did during the rapid development of the Western States,—a loss of population without any compensating advantages in the way of trade, while eastern Canada will be built up by the trade of the north-west.

But remove the tariff wall between the two countries, and the bulk of this trade may be secured by the United States, for settled Ontario is separated from Manitoba by a stretch of one thousand miles of rocky country, enormously rich in minerals and timber, but almost useless for agricultural purposes, while the territory of the United States is well settled to the borders of Manitoba. Chicago is many miles nearer to Winnipeg than Toronto, and St. Paul and Minneapolis are nearer still. These cities could control most