SCIENCE.

FRIDAY, JUNE 3, 1887.

COMMENT AND CRITICISM.

PROF. ARTHUR T. HADLEY'S thorough acquaintance with the railway problem puts it in his power to make a popular exposition of it that for clearness and conciseness is unrivalled. In *Harper's magazine* for June he outlines the progress of American railroad legislation. The Clinton league, the Granger movement, and the general railroad laws are touched upon, and their relation to each other shown. Then followed what may be called the period of state railroad commissions, that of Massachusetts being the example for nearly all the others. The state of affairs when the movement for a national railroad law became prominent, is characterized thus: "By the year 1880 it had become a well-established principle that it was impracticable to fix rates directly by law; that the important thing was to secure publicity and equality, and, above all, to have the means of holding the railroads responsible for what they did. On the other hand, the railroads had come to recognize, what ten years before they would have denied, that their business was not a purely private one; that they had public rights and responsibilities, and could not claim immunity from legislative control." Professor Hadley traces rapidly the genesis of the present Interstate commerce law, and in so far as it forbids preferential rates, provides for the publication of rates, and prohibits secret drawbacks, he unreservedly commends it. In its provisions as to local discrimination, however, and in its prohibition of pools, it is regarded as open to serious objection. But it is best regarded as a step to something wiser and better, as an experiment from whose failures a more perfect measure will be suggested. When this more perfect measure comes, it will doubtless, as Professor Hadley says, recognize the fact that railroad history plainly teaches that what we need is not so much a set of laws or regulations, but publicity and responsibility in railroad administration.

THE TRUSTEES of the Elizabeth Thompson science fund have made the following grants, of which we have the pleasure of making the first public announcement: 1°. To the Natural history society of Montreal, $200, for the investigation of underground temperatures by a committee of that society; 2°. To Dr. T. Elster and H. Geitel, instructors at the gymnasium of Wolfenbüttel in Germany, $210, for researches on the electrization of gases by glowing bodies; 3°. To Prof. E. D. Cope of Philadelphia, $500, for researches on American fossil vertebrates, the sum to be expended to secure the services of a skilled preparateur to assist in working out the material already accumulated for the continuation of Professor Cope's great work; 4°. To W. H. Perkin, jun., of Manchester, England, privat-docent at the University of Munich, Germany, $250, for investigations on the synthesis of urea from its decomposition products; 5°. To Edward E. Prince of St. Andrews, Scotland, $125, for the investigation of the development and morphology of the limbs of teleosts. It may be worth while to add, that these appropriations indicate that the trustees are inclined to make several appropriations of moderate amount rather than a single large one. It will be noted that no grant over $500 has been made. This point may be of interest to intending future applicants.

SEA-SICKNESS.

THE sensation of sea-sickness is one which has in one form or another been experienced by most persons, if not on the sea itself, at least while riding backward or in swinging. It is the dread of this rather than the fear of accident which deters many from undertaking a European tour, and it is therefore a question of great interest whether or not this experience may be avoided, and thus the principal obstacle to an ocean voyage be removed.

Although in most instances sea-sickness is but temporary, disappearing as soon as the affected individual places his foot on shore, still this is not always the case. In rare instances it has been the cause of death, and even when this has not been the case, the individual has been permanently affected. In many cases what is usually but an inconvenience and a disagreeable sensation becomes a disease which demands medical treatment on account of the violence of its symptoms. It is for

these reasons that physicians have made a study of sea-sickness, and have in various publications given the results of their investigations to the world.

In Quain's 'Dictionary of medicine' sea-sickness is defined as a peculiar functional disturbance of the nervous system, produced by shock, resulting from the motion of a ship. The most prominent symptoms are a state of general depression, giddiness, vomiting, and derangement of the bowels and of the urinary secretion. Dr. B. W. Richardson, in his 'Field of disease,' says that the phenomena of sea-sickness may be placed under the same head, in regard to cause, as concussions experienced by iron-plate workers who are employed in riveting, or by travellers on railroads. In sea-sickness the effect of the motion of the vessel is to produce a series of shocks to the ganglionic or organic as well as to the cerebro-spinal system. In some persons the organic nervous system is chiefly affected, and they suffer from vomiting and loss of appetite, and may remain prostrated for many weeks, and in one instance the sickness was never entirely recovered from during a comparatively long life; in others the shock tells most upon the brain and spinal cord. Such cases are less troubled with vomiting, but are oppressed with headache, giddiness, and inability to stand upright or move with steadiness. After they have completed the voyage, these persons suffer still from unsteadiness in walking, feeling, as they express it, the movements of the vessel. A repeated series of concussions, as it were, affected the brain so as to leave an impression of a wave-like motion, which does not subside until after a considerable length of time.

Various other theories have been held in regard to the causation of sea-sickness. Wollaston, who wrote on the subject in 1810, considered it due to sanguine congestion of the brain brought on by a deranged centre of gravity during the pitching forward of the vessel; Barru believed it to be owing to irritation of the optic nerves caused by the apparent vacillation of every thing around the vessel; Pellarin accounted for it by sanguine depletion in the brain caused by a centrifugal force called into action within the blood-vessels in consequence of the oscillation of the ship. In more ancient times Plutarch treated of the subject, and attributed sea-sickness to the smell of the sea and the fears of the patient.

Among those who have written treatises on the subject, we mention Dr. John Chapman as one whose treatment has been measurably successful. This writer gives it as his opinion that the main proximate cause of the affection is an undue amount of blood in the spinal nervous centres, and especially in those parts of them directly related to the stomach and the muscles concerned in vomiting. The result of this hyperaemia is that the nerves emanating from the affected nervous centres partake of the undue activity of the centres themselves, and convey to their ultimate distributions an excessive amount of nervous impulses, which have the effect of disturbing the ordinary action of the organs supplied.

It will be seen from this brief consideration that there are many and various theories in regard to the causation of sea-sickness, and the number might be increased did space permit. As would naturally be expected, the methods of treatment are also various. Dr. Chapman recommended the application of ice, contained in rubber bags, to the spine, with the idea of overcoming the hyperaemic condition of the spinal cord, which he believed to be the cause of the symptoms. Some twenty years ago this plan of treatment was adopted by a considerable number of individuals, and remarkably favorable results were reported. Travellers crossing the Channel and making sea-voyages, who had previously suffered severely from sea-sickness, were by means of the ice-bag enabled to make their journeys with comfort, and freedom from sickness. In recent years we have heard but little of the ice-bags. Whether this is to be accounted for on the ground that on a fuller trial they failed to accomplish all that was claimed and expected, or whether the difficulty connected with their use was too great for them ever to come into general use, we do not know. In a recent letter to a daily paper a correspondent states that he has made twenty-six trips, or fifty-two tours, across the Atlantic, and has in every instance, except the last, suffered very much from sea-sickness. On this last trip he had with him a rubber bag, twelve inches long and four inches wide, the mouth of which was closed by an iron clamp. This he filled with small pieces of ice and applied to the spine at the base of the brain for half to three-quarters of an hour every morning. It had a most soothing effect, and he enjoyed every hour and every meal.

In a recent number of the *Boston medical and surgical journal* is a letter from William James of Harvard college, in which he says that whilst studying the feeling of dizziness, he was led to discover the singular immunity from it which deaf-mutes, as a class, possess, and he attributes this to the destruction either of the auditory nerves or of their labyrinthian termination. He found also in deaf-mutes what seemed signs of a possible immunity from sea-sickness, and ventured the suggestion that the semicircular canals

were probably the starting-point of that affection also, and that its symptoms in an ordinary sufferer might be alleviated by blistering or otherwise counter-irritating the skin around the ears. Later, in crossing the English Channel, he thought he prevented an attack of sea-sickness in himself by rubbing the mastoid processes with his fingers. He has since been unable to get any one to try the plan. He refers to an account of an accident which happened to the editor of the *Gulf review*, of Florida, as confirmatory of his views of the cause of sea-sickness. In this accident the editor received a blow on the mastoid process just behind the right ear, crushing the outer table of the skull, and destroying the delicate nervous portion of the internal ear, including the semicircular canals. The immediate consequences of the injury were, first, the most distressing nausea of a character identical with sea-sickness, which lasted, with intervals of ease, for two or three days; and, secondly, complete destruction of the function of the ear, being deaf in that ear ever after. Shortly after convalescence, the writer made a voyage to Cuba and back in rough weather, exposed to a very rough sea for six days each way, and, although previously very susceptible, he found himself proof against sea-sickness; and this immunity has continued ever since, now nearly twenty-eight years. Dr. James requests that travellers will bear his suggestion in mind, and report to him the result, whether successful or failures.

Dr. Fordyce Barker, an eminent physician of New York, and a traveller by ocean of great experience, has also suggested a method for the treatment of sea-sickness. He recommends that in making a short passage over rough water a hearty meal should be eaten not more than two or three hours before sailing, and that the individual should, if possible, keep in the centre of the vessel, and lie down before starting, and that he should avoid disagreeable sights and smells. In making ocean voyages, he should select his berth with these same objects in view, and should remain in bed for one or two days, and eat regularly and heartily. He should take a cup of coffee or tea each morning before rising, and should keep the bowels regulated. If diarrhoea sets in, it should be controlled by the remedies usually given for cholera-morbus. If the weather becomes rough, he should go to bed before becoming sick.

It may be of interest to note that a large number of remedies has been recommended from time to time, by physicians and others, for sea-sickness. Among them are the bromides of potassium and sodium, hydrate of chloral, opium, chloroform, hydrocyanic acid, alcohol, nitrite of amyl, cocaine, strong coffee, Hoffman's anodyne, bismuth, bicarbonate of soda, and nitroglycerine; for external application, ice, stimulating liniments of belladonna, chloroform and camphor, and hot bottles to the feet. It is a safe principle in medicine that when, for any given disease, a large number of remedies is recommended, the specific remedy, or that which will cure all the cases of that disease, or the most of them, has not yet been discovered. The writer in Quain's dictionary says, on the subject of treatment, it may be premised that there is no known means of preventing sea-sickness in those susceptible of it. We should be glad to have the recommendation of Dr. James carried out, and to receive reports from those who, during the coming summer, may try his plan.

THE MEETING OF THE ECONOMIC AND HISTORICAL ASSOCIATIONS.

ON Tuesday morning, May 24, the Historical association listened to papers on 'A study in Swiss history,' by J. M. Vincent of Johns Hopkins university; 'The Spaniard in New Mexico,' by Gen. W. W. H. Davis; and 'The historic name of our country,' by Prof. Moses Coit Tyler of Cornell. The Economic association first heard the report of its committee on the 'Condition and organization of retail trade,' which was the subject of some discussion, and then Prof. Henry C. Adams read a report on 'Municipal public works.' The replies to the committee's circulars to gas companies were interesting.

Circulars were sent to 971 gas companies in the United States; and of these, 675 sent replies to various questions relative to price of gas per thousand cubic feet. The prices ranged all the way from 75 cents to $20 a thousand feet. All over $6 were considered so abnormal as to be put out of consideration. It was found that the average price of the coal-gas companies was $1.73, that of water-gas $1.85, and the total average $1.75, per thousand feet. It was remarked, that, although the average cost of producing water-gas was not as great as that of the coal-gas, the price of the former was greater. This is due to the fact that popular ideas of relative danger and other circumstances did not warrant the production of the water-gas on so large a scale as the coal-gas companies are warranted in producing it.

The afternoon session was a joint one of both associations, and was held at Sander's theatre, Harvard university. Three papers were presented. The first, by Prof. E. J. James of Philadelphia, was on 'Our legal tender decisions,' and