

connection with such an American exposition would interest the people more, and no other would be more instructive; and it is proposed or suggested by the Citizens' Committee that a great archæologic exhibit be made, and that each nation in North, Central, and South America be invited to contribute its quota to this great museum. The erection of an appropriate building for this purpose, indestructible by fire, and of sufficient magnitude for the instalment of so great a collection, would cost about five hundred thousand dollars. The archæologic materials to be found within the territory of the United States are in part, but only in small part, collected, and now in the National Museum; and the time is all too short for the completion of this collection, yet by beginning soon it might be well done.

"Such, in brief, is the plan which I was requested to present to you by the Citizens' Committee. It is no less than to collect and put on record for future generations the priceless records that constitute the history of all the native American races. If this can be done, it will be a monument to these native peoples, erected by the invading and conquering and civilizing nations, worthy of Aryan power, and worthy of Aryan culture."

#### WHEAT-CULTIVATION.

IN the last number of the Journal of the Royal Agricultural Society of England, the most interesting sections are those bearing upon wheat-cultivation. A paper upon the condition of wheat-growing in India, by Dr. George Watt, is followed by an article by Mr. W. E. Bear upon the Indian wheat trade, and in this connection is given an interesting account of modern improvements in corn-milling machinery. These papers throw considerable light upon the difficulties under which the English wheat-grower is struggling, and are commented on by Mr. Wrightington in a recent number of *Nature*.

Dr. Watt and Mr. Bear show the extraordinary extent of the wheat-producing area of the Indian Empire, and the rapidity with which this vast field is being opened up. With reference to the latter point, men in middle life are scarcely likely to realize the fact that in 1853 there were in all only 20½ miles of railway in India, that in 1873 there were 5,695 miles of railway, while in 1887 there were 13,386 miles. Telegraphic communication with India was first opened in 1865, and the opening of the Suez Canal in 1869 was scarcely of less importance in developing her trade, first by shortening the passage, and second by mitigating the risk from wheat-weevil. Another agency has been the development of irrigation-works. We read that "only" 30,000,000 acres have up to date been artificially irrigated; but the appropriateness of the qualifying adverb is rendered evident when it is employed in contrast with the total area of 200,000,000 acres of cultivated ground, and the vast tract of 868,314 square miles which include British India. The normal area under wheat is 26,000,000 acres, and the degree to which this area is likely to be increased depends entirely upon demand and price. Dr. Watt informs us that the Indian cultivator is at all times ready to adapt his courses of cropping to circumstances, and that he will increase or abandon the cultivation of wheat, cotton, or any other crop according to its comparative profitability.

Dr. Watt comes to the conclusion that the Indian wheat trade up to the present time is a perfectly natural one. "The people are exporting only what they specially cultivate for that purpose. The moment better profits can be realized on another crop, they will turn from wheat, without being in the least degree incommoded." If this is the case, the English farmer may well look with envy upon his Indian brother, as he is in the unfortunate position of being compelled to carry on wheat-growing from sheer inability to find a substitute for it in his agricultural economy. Natural though the course of the ryot may be from his point of view, the actual bounty upon wheat, or what amounts to a bounty, consequent upon the fall in value of the rupee, can scarcely be described as natural. This great advantage to the Indian cultivator is clearly brought out by Mr. Bear by the following considerations: First, the Indian ryot gets as much for a quarter of his wheat now as he obtained in 1872. He gets as many rupees, and his rupees are worth as much to him as they were then. In 1871-72 the average exchange value of the

rupee was 1s. 11.12d., whereas recently it has been under 1s. 5d. The price of No. 2 club wheat in Calcutta in 1872 averaged only 2rs. 3s. 1p. per maund, whereas it has for some time past been over 2rs. 10s. Taking 16rs. per quarter (6 maunds) as the price for both periods, then reckoning the exchange value of the rupee for both periods, it is clear that the exchange value of 16rs. in 1872 was equal to 30s. 8d. per quarter, whereas the exchange value of the same sum in 1888 is only 22s. 8d. The fact is that the Indian ryot gets as much for a quarter of wheat now as he did in 1872, in spite of the fall in prices. He gets as many rupees, and his rupees are worth as much to him. This seems to settle the question as to the encouragement given to the ryot as a competitor in wheat-growing with the English farmer. Another point, in all respects discouraging to the cultivation of wheat in England, is found in the complete revolution during the last ten years in corn-milling machinery described by Mr. W. Proctor Baker of Bristol. There has been, in fact, not a mere substitution of one machine for another, or of one series of machines for another, but there has been a change of the principle and mode of procedure. The old system of 'low grinding' by mill-stones, so well calculated for producing flour from soft, tender wheats, such as are produced in England, has been entirely superseded by the Hungarian and American 'gradual reduction' process by 'roller mills.' Not only does this system require the wheat to be dry, hard, and brittle, so as to secure the requisite cracking and gradual reduction, but any thing in the form of a soft or moist wheat is most injurious to the machinery and the products. It rolls into a paste, steam is generated, and the flour works into balls, becomes attached to the rollers, turns sour, and, in fact, throws the entire process out of gear. "It is because of these troubles that owners of mills on a large scale will not employ native wheats in damp seasons. No concession of price is sufficient inducement to them to risk the disorganization of the mill, and probable loss of reputation, by turning out inferior or irregular flour." There are, however, two modes in which these wheats may be used,—first, by submitting them to an artificial drying process; and, second, by mixing them with some description of very brittle wheat, and allowing the mixture to lie for some weeks, until the brittle wheat absorbs some of the moisture of the native wheat, to the mutual advantage of both.

#### THE MARINE BIOLOGICAL LABORATORY.

THE new laboratory is at Wood's Holl, Mass. A convenient site has been secured close to the shore and to the laboratories of the United States Fish Commission. The laboratory building consists of two stories; the lower story for the use of students receiving instruction, the upper story exclusively for investigators. The laboratory will have boats, dredges, and other collecting apparatus; it will also be supplied with running sea-water, with alcohol and other re-agents, glassware, microtomes, aquaria, etc., a limited number of microscopes for students' use, and a small reference library.

Dr. C. O. Whitman, the distinguished embryologist, has accepted the directorship; and Mr. B. H. Van Vleck, who has had greater experience than any one else in this country in the management of summer seaside biological schools, has been appointed instructor. Under these very competent officers, the laboratory will attract probably more persons than can find accommodation; nevertheless it remains a matter of regret that the announcement of the opening of the laboratory has been so much delayed, owing, we understand, to some unavoidable difficulties in completing the preliminary arrangements.

The laboratory for students will be opened on Tuesday, July 17, at 9 A.M., for a systematic course of six weeks in zoölogy. By permission of the director, students may continue their work until Sept. 20 without additional payment. Microscopes, glass-ware, etc., will be supplied without extra charge except for breakage. Hand lenses, dissecting instruments, drawing materials, etc., may be bought at cost in the laboratory. It is desired that students owning microscopes should bring them.

The fee for this course is twenty-five dollars. The number of students will be limited to twenty-five.

The laboratory for investigators will be opened on July 10, and