SCIENCE.

AN ILLUSTRATED JOURNAL PUBLISHED WEEKLY.

Vérité sans peur.

NEW YORK: THE SCIENCE COMPANY.

FRIDAY, JULY 2, 1886.

COMMENT AND CRITICISM.

THE BUREAU OF EDUCATION has made a valuable addition to our educational literature by its recent publication of a paper by Dr. E. M. Hartwell of the Johns Hopkins university, on physical training in American colleges and universities. '*Mens sana in corpore sano*,' is perhaps as familiar as any classical quotation to collegiate trustees and professors, but in the past they have been inclined to trust too much to time and luck to give it a practical application. The progress we are now making in organized physical education is the most significant fact brought out by Dr. Hartwell's investigations. He shows that until 1859 no college in the country possessed a commodious and well-furnished building devoted to the purposes of physical training. In that year, however, Amherst, Harvard, and Yale built gymnasia. Amherst seems to have been the most progressive in this matter; and though its first gymnasium has since been replaced by a costly and much-improved building, yet from the first, physical exercise has been required there of all able-bodied students, and it has been directed by an educated physician with a seat in the faculty.

The Hemenway gymnasium at Harvard, and the supervision of Dr. Sargent, have not only given a great impetus to physical training there, but Dr. Sargent's system of directive exercise has been widely adopted. Since 1879, forty-eight institutions have fitted up their gymnasia with Dr. Sargent's apparatus; and his directions are now followed in very many of them, including Amherst, Cornell, Haverford, Johns Hopkins, Lehigh, and Swarthmore. The same system has just been introduced into Lafayette, and is projected at Vassar and the University of Vermont. The statistics and detailed information that accompany the paper are of great value and interest, but its general tenor is more valuable and interesting still. It shows that education — physical, intellectual, and moral, as the phrase is — has become something more than a meaningless motto in many of our leading educational institutions.

THE TRUSTEES OF THE Elizabeth Thompson science fund have made the following grants for research from the income of the fund: 1°, H. M. Howe of Boston, Mass., seventy-five dollars, for investigations on the fusibility of slags from the smelting of lead and copper, to be carried on in the mining laboratories of the Massachusetts institute of technology; 2°, two hundred dollars to the New England meteorological society, for the working-out of results from the very numerous data which are now collected by the society concerning the movements of local storms; 3°, one hundred and fifty dollars to Samuel Rideal, Esq., of University college, London, for the continuation of Tyndall's experiments on the absorption of radiant heat by aromatic gases; 4°, five hundred dollars to Professor Rosenthal of Erlangen, Germany, for researches on the production and regulation of animal heat in health and disease, with special reference to fevers. As the number of applications was very large, the sums asked for amounting to about thirty thousand dollars, it became necessary for the trustees to refuse several applications which entirely commended themselves on account of the character of the applicants and the nature of the proposed work. The invidious task of selection was of course difficult in the extreme, so that it is unadvisable to give the grounds for the preferences finally adopted. On the other hand, the very number of applications increases the probability of the fund being devoted to the support of thoroughly fruitful researches. It is a somewhat unexpected turn of fortune's wheel which delivers an American endowment, even in part for the prosecution of research, at a German university; but it should not be overlooked that the fund was established primarily to further the utility of the proposed international scientific congress, and that

it would violate the spirit of the trust to confine the grants to persons in this country. There is, so far as we are aware, no other endowment of science so generously wide in its scope: we hope, therefore, that it will always be employed to assist only the very best work, and that the trustees will so earn the faith of the public, that the endowment will be very largely increased by liberal patrons.

IN A RECENT NUMBER of *Science* (vol. vii. No. 160, supplement) we published several articles by Mr. J. A. Allen and others on the destruction of our native birds. Facts and figures were presented, tending to show that the killing of birds for millinery purposes and for food, together with their destruction in wanton sport, was liable to cause a serious diminution of our birds, and perhaps the extinction of some species useful to man or desirable for their song. The views thus expressed were indorsed by a committee of the Society of natural history of Cincinnati, in a report to that body; and this report has brought out a reply from Dr. F. W. Langdon in an address before the same society, in which he dissents from our conclusions. He points out that the birds most largely used for millinery purposes are those living by the seashore, such as gulls, terns, herons, and others, which are not song-birds nor beneficial to the farmer. As for the destruction of the birds in such places as the Everglades of Florida, he thinks these are doomed to extirpation in any case when the growth of population shall have led to the clearing and draining of the swamps. He admits, however, that some song-birds are made use of by milliners; but he gives some results of his own and others' observation which seem to show that the number of such birds destroyed is not very great. He adds that most of our familiar song-birds, such as thrushes, wrens, and finches, are in little demand for millinery use, owing to their being usually of plain colors, but does not seem to notice that their skins may be dyed. Mr. Allen, in his article above referred to, had estimated the number of birds required in this country to meet the demands of the milliners at 5,000,000 a year; but Dr. Langdon thinks, that, even if this estimate is correct, the loss of that number of birds in a year will have no appreciable effect on the aggregate. He estimates the total number of birds on the continent at 3,000,000,000, and the annual increase at the same number; and, allowing a second 5,000,000 for the demand from other countries than our own, he finds the percentage destroyed each year to be very small. He infers, therefore, that, even if all the birds destroyed were song-birds or birds useful to the agriculturist, the annual loss would have no practical effect on the fauna of the country at large.

MR. FRANCIS GALTON has been devoting the last year or two to a study of stature as an hereditary trait. From a large number of family records, in which the heights of the members of at least three generations are recorded, he attempts to assign the proportionate contributions of each ancestor towards the height of the descendant. He has formulated a law which partly opposes and partly supplements the common notion that the children of parents both possessing certain qualities will probably have the same qualities in even a greater degree than either parent. This law maintains that a constant tendency to mediocrity exists; that the qualities of the parents will not summate, but the average will be the probable result. Perhaps none of his ingenious researches will meet with more criticism than this, it seems to run counter to so many well-known facts of heredity. The research with regard to stature is only a typical one. In a more recent report he has carried over the same method to the consideration of the color of the eyes as affected by heredity, and shows the validity of the law in this field. Mr. Galton has presented his views in his presidential address before the British association and in articles in the Journal of the anthropological institute; but the full paper will appear in the Proceedings of the Royal society, and perhaps a judgment ought to be suspended until all the facts are in.

SEVERAL INSTANCES have been reported in the past few months where large numbers of persons have been made sick by ice-cream. The theories which have been advanced to explain this result have been many and various. By some it has been attributed to the absorption of copper from the vessels in which the cream was made; others have thought it due to decomposition of the gelatine which is now commonly used to give stiffness to the cream; while still others have thought it might be traced to disease in the cows from which the milk was obtained. Prof. V. C.

Vaughan, of the University of Michigan, has recently investigated the poisoning of a number of persons by ice-cream at Newton, Mich., and is reported to have found tyrotoxicon present in the ice-cream which produced the sickness. This had been previously discovered by Professor Vaughan in pieces of cheese which had caused sickness, and which had been submitted to him for examination. Whether this poison is due to a germ, or to a chemical product, does not yet seem established; but it is but another proof of the possibilities of milk, either infected or decomposed, acting as a factor in disease, and it is not improbable that diarrhoeal diseases so common among the infantile population in the summer months may be caused, or at least aggravated, by milk which contains the tyrotoxicon.

THE BILL authorizing the President to appoint a commission to investigate yellow-fever and the methods proposed for its prevention has passed the senate, and, as there is now no opposition to its passage in the house, there is every probability of its becoming a law. In the mean while, Dr. Freire, who claims to have discovered the microbe of the disease and a method of inoculation to prevent its ravages, is reported to have performed the operation upon seven thousand persons living in localities where yellow-fever is prevailing in a most malignant form. Of this large number, but eight have died. During the same period, some three thousand uninoculated persons have succumbed to the fever. Should the bill to which reference has been made obtain a place in the statutes, these claims of Freire will be subjected to rigid investigation by the best American experts, and, if substantiated, will doubtless be the means of introducing his system, or a modification of it, into the United States, whenever yellow-fever shall again appear in epidemic form.

IT HAS ALWAYS been difficult to understand how the germ theory of disease could be true, and yet the diseases which are due to germs could vary so much in virulence; at times being exceedingly mild, and again malignant in the highest degree. Dr. Sternberg, in a recent paper published in the *Medical news*, makes this very clear, thus removing what has to many seemed an insuperable objection to the acceptance of the germ theory. Germs which produce disease, that is, pathogenic germs, are subject to great modification as regards this power. Germs which to all appearances are the same, and which, so far as we know, are in fact identical in most particulars, may yet differ in their virulence; being extremely so under some circumstances, and but slightly so under others. It is for this reason that virus may be 'attenuated,' as it is termed, Thus the microbes which produce fowl-cholera in a fatal form may, after two or three months, lose this virulence, and still possess some pathogenic power. It is this principle of attenuation which enables experimenters to inoculate animals with the same microbe, but of gradually increasing virulence, until perfect protection, even against the most virulent form of the disease, is assured. A mild attack of scarlet-fever is explained, therefore, not on the ground that only a few microbes of the disease exist in the body of the individual attacked, for we know that this form of life multiplies with enormous rapidity, but by the probable fact that the microbes in this individual case possess a mild degree of virulence.

The further and deeper research is made into this domain of bacterial life, the more apparent does it become that disease-producing germs are wide-spread and abundant; and, if animals susceptible to any particular variety come in contact with that variety, it is easy to understand how disease may be contracted, even when no other animal has been brought in contact with them. For instance: the bacillus which causes fowl-cholera is found in various parts of the world in putrid substances, and as a result epidemics of fowl-cholera are most frequent among fowl that are kept in unsanitary conditions. In the same way typhoid-fever and cholera may develop irrespective of human intercourse or *fomites*. Much of this may seem trite, but the tendency of the present day is to ignore filth as a factor in the production of germ-diseases, and to limit their causation to the presence of other similarly affected persons or animals, and to the articles which have been in contact with them. In helping to clear up the question, Dr. Sternberg has done good service.

THE ECONOMIC DISCUSSION IN SCIENCE.

IT is often doubted whether any good comes of polemical discussion in a periodical; and so obvious are the disadvantages under which those labor who would maintain a scientific position in