

THE BRITISH ASSOCIATION FOR THE
ADVANCEMENT OF SCIENCE.

Papers on Science from America.—Rev. P. P. Carpenter read a paper on the "Progress of Natural Science in the United States and Canada," in which he gave an explanation of the principles and working of the Smithsonian Institute at Washington, and some account of the contents and management of our State museums and scientific collections, to the authorities of which he awards high praise for liberality in their intercourse with European bodies, as well as for the excellence of their arrangements. Dr. McGowen, of New York, read a paper on the "History of the Anti-Christian Settlement of the Jews in China." Professor Draper, of New York, read a notice on a "Reflecting Telescope for Celestial Photography, now erecting near Hastings, N. Y." Professor W. B. Rodgers, of Boston, read a paper on "Experiments and Conclusions on Binocular Vision." A letter was read on "Antarctic Expeditions," from Capt. Maury, United States Navy, to Lord Wrottesley. Mr. E. Jarvis, of Boston, read a paper on the "System of Taxation prevailing in the United States." Mr. J. F. Train, of Boston, read a paper descriptive of street railroads, as used in the United States. Col. Shaffner reported on the "Geography of the proposed Communication (telegraphic) between England and America, via the Faroes, Iceland, and Greenland."

Intellectual Development of Europe.—The paper which has perhaps called forth the greatest amount of keen and excited discussion was that of Professor Draper, of this city, on the intellectual development of Europe, considered with reference to the views lately propagated by Dr. Darwin. The object of this paper was to show that the advancement of man in civilization does not occur accidentally or in a fortuitous manner, but is determined by immutable law. The author introduced his subject by recalling proofs of the dominion of law in the three great lines of the manifestation of life. First, in the successive stages of development of every individual, from the earliest rudiment to maturity; secondly, in the numberless organic forms now living contemporaneously with us, and constituting the animal series; thirdly, in the orderly appearance of that grand succession which in the slow lapse of geological time has emerged, constituting the life of the earth, showing therefrom not only the evidences, but also proofs of the dominion of law over the world of life. In those three lines of life he established that the general principle is to differentiate instinct from automatism, and then to differentiate intelligence from instinct. In man himself, three distinct instrumental mechanisms exist, and three distinct modes of life are perceptible—the automatic, the instinctive, the intelligent. They occur in an epochal order, from infancy through childhood to the more perfect state. Such holding good for the individual, it was then affirmed that it is physiologically impossible to separate the individual from the race, and that what holds good for the one holds good for the other, too; and hence that man is the archetype of society, and individual development the model of social progress, and that both are under the control of immutable law; that a parallel exists between individual and national life in this, that the production, life, and death of an organic particle in the person answers to the production, life and death of a person in the nation. Turning from these purely physiological considerations to historical proof, and selecting the only European nation which thus far has offered a complete and completed intellectual life, Professor Draper showed that the characteristics of Greek mental development answer perfectly to those of individual life, presenting philosophically five well marked ages or periods—the first being closed by the opening of Egypt to the Ionians; the second, including the Ionian Pythagorean, and Eleatic philosophies, was ended by the criticisms of the sophists; the third embracing the Socratic and Platonic philosophies, was ended by the doubts of the sceptics; the fourth, ushered in by the Macedonian expedition, and adorned by the splendid achievements of the Alexandrian school, degenerated into Neoplatonism and imbecility in the fifth, to which the hand of Rome put an end. From the solutions of the four great problems of Greek philosophy, given in each of these five stages of its life, he showed that it is possible to determine the law of the variation of Greek opinion, and to establish its analogy with that of the

variation of opinion in individual life. Next, passing to the consideration of Europe in the aggregate, Professor Draper showed that it has already in part repeated these phases in its intellectual life. Its first period closes with the spread of the power of republican Rome, the second with the foundation of Constantinople, the third with the Turkish invasion of Europe: we are living in the fourth. Detailed proofs of the correspondence of these periods to those of Greek life, and through them to those of individual life, are given in a work now printing by the author in America. Having established this conclusion, Professor Draper next briefly alluded to many collateral problems or inquiries. He showed that the advances of men are due to external and not to interior influences, and that in this respect a nation is like a seed, which can only develop when the conditions are favorable, and then only in a definite way; that the time for psychical change corresponds with that for physical, and that a nation cannot advance except its material condition be touched—this having been the case throughout all Europe, as is manifested by the diminution of the blue-eyed races thereof; that all organisms and even man are dependent for their characteristics, continuance and life, on the physical conditions under which they live; that the existing apparent invariability presented by the world of organizations is the direct consequence of the physical equilibrium, but that if that should suffer modification, in an instant the fanciful doctrine of the immutability of species would be brought to its proper value. The organic world appears to be in repose because natural influences have reached an equilibrium. A marble may remain motionless for ever on a level table, but let the table be a little inclined, and the marble will quickly run off; and so it is with organisms in the world. From his work on physiology, published in 1856, he gave his views in support of the doctrine of the transmutation of species; the transitional forms of the animal and also the human type; the production of new ethnical elements or nations; and the laws of their origin, duration and death.

DISCUSSION.

The announcement of the above paper attracted an immense audience. The Rev. Mr. Creswell denied that any parallel could be drawn between the intellectual progress of man and the physical development of the lower animals. So far from the author being correct with regard to the history of Greece, its master-pieces in literature—the Iliad and Odyssey—were produced during its national infancy. The theory of intellectual development proposed was directly opposed to the known facts of the history of man.

The next speaker was Sir B. Brodie, who stated that he could not subscribe to the hypothesis of Dr. Darwin. His primordial germ had not been demonstrated to have existed. Man had a power of self-consciousness—a principle differing from anything found in the material world, and he did not see how this could originate in lower organisms. This power of man was identical with the divine intelligence; and to suppose that this could originate with matter involved the absurdity of supposing the source of divine power dependent on the arrangement of matter.

The learned and venerable Bishop of Oxford stated that the Darwinian theory, when tried by the principles of inductive science, broke down. The facts brought forward did not warrant the theory. The permanence of specific form was a fact confirmed by all observation. The remains of animals, plants and man found in those earliest records of the human race—the Egyptian catacombs—all spoke of their identity with existing forms, and of the irresistible tendency of organized beings to assume an unalterable character. The line between man and the lower animals was distinct; there was no tendency on the part of the lower animals to become the self-conscious, intelligent being, man; or in man to degenerate and lose the high characteristics of his mind and intelligence. All experiments had failed to show any tendency in one animal to assume the form of the other.

Dr. Hooker, the celebrated botanist, having been called upon for his views, said that they accorded with those of Mr. Darwin, and that the Bishop of Oxford did not understand them. Mr. Darwin seems to have set the scientific world by the ears; it is no easy thing to arrive at what he does mean in many cases.

AN IMPROVEMENT NEEDED IN SUGAR-CANE MILLS.

Messrs. Editors:—Regarding sugar-cane mills for pressing cane, I think something new must be got for that purpose, cheap and more economical than anything yet existing, so as to suit small farmers who are raising their own sweetening upon their own farms for their own family use—and there are many such since the Chinese sugar cane has been introduced into the United States. I wish it understood that, were it possible to obtain all the juice of the sugarcane, there would be a yield of from 87½ to 90 per cent of liquid; that is, from 100 lbs. of cane stalks, there would be a yield of from 87½ to 90 lbs. of juice extracted, a result, never, perhaps, to be attained. But it must be lamented that, upon an average with all the mills in use, fully one-third of the whole quantity of juice is left remaining in the cane after it has passed through the mill, which is all lost, or worse than lost, as the "bagasse" (as the pressed cane is called) makes good fuel when dry, and is generally used for that purpose. The best horizontal iron roll mills, driven by powerful steam engines, yield from 70 to 75 per cent only of the juice; while the more imperfect grinding often reduces it below 50 per cent, which is a shameful waste. As an improvement, I would suggest that one of the rollers of the mill, as mills exist at present, should be covered with a length of thin india-rubber tubing, so as to render the two last rollers absolutely close on one another, so that when the cane was passing through the mill, each piece would have the appearance of coming through a hole—that is, the cane, to a certain extent, would seem imbedded in the rubber that covered the solid hard roller, and no juice could then follow the rolls as they turn round to be absorbed by the spongy bagasse, as at present. I am of the opinion that the cane, as a general thing, is sufficiently pressed in going through the mill, but the absorbing nature of the pith drinks back a portion of the liquid the moment the cane is released of its pressure and when still between the rollers, before it can be observed by the closest watching. The rubber which I propose need not be over one-eighth of an inch in thickness, and only one roller need be covered with it (whether of wood or iron), and there would be no use in passing the cane more than once through the mill. J. T.

Wayne Center, Ill., August 6, 1860.

A PERNICIOUS DENTIFRICE.

Messrs. Editors:—A few weeks ago you published an extract from the *Dental Cosmos*, in which article "soap" is recommended as "the great dentifrice to be used at all times and under all circumstances." In the same number of the *Dental Cosmos*, Dr. J. D. W. (whose views are seldom wrong) says that soap should not be used under all circumstances; and many other writers object to it entirely. I have given much attention to dentifrice, during a practice of about 16 years; and I am very sure that soap is injurious in a majority of cases.

As soap is a very common domestic article, it is very likely to be used to an abusive extent—particularly when recommended by so high an authority as the *Dental Cosmos* and endorsed by the *SCIENTIFIC AMERICAN*. I hope, therefore, that you will have the kindness to lay this variety of opinions before your many readers, and endeavor to dissuade them from the general use of soap as a dentifrice. A. H. T.

Lambertville, N. J., August 6, 1860.

THE MAGNETIC PROPERTIES OF IRON.

Messrs. Editors:—It is well known that if a piece of iron wire is twisted it acquires magnetism; and if freely suspended, it points to the magnetic poles, and attracts iron filings or small pieces of iron. If a piece of iron that may be readily filed is put in contact with a powerful magnet, great difficulty will be felt in filing it when in this position. We must suppose that the particles of iron undergo some change in those experiments. The strength of iron under such circumstances should be tested; and trials should be made to ascertain whether magnetism is induced in twisted gun barrels, and whether such condition adds to their strength. Magnetism may be induced in a gun barrel by a helix of copper wire wound round it, through which wire a current of electricity is passing. Let its strength in this condition be compared with a similar barrel under ordinary circumstances. T. B. WHITE.

New York, August 4, 1860.