

After the volcanic period, the land rose again, the time of emergence embracing the glacial period and the new eroding period in the sierra, during which the slates, and the hard metamorphic greenstones, and the granites were slashed with cañons three thousand feet deep by the action of ice and running water. Taking the rates of continental movement determined by Lyell, our geologist calculates that the time required for the changes thus outlined could not have been less than eighteen hundred centuries. For a period so long preceding the glacial epoch as the time when ancient Cherokee was buried by the waters of the advancing sea, his estimate is certainly not extravagant, though it does transcend so enormously the time men have been accustomed to allow for man's residence on earth.

#### APPARITIONS.

From time to time, as there was occasion, we have referred to the so-called revelations of modern spiritualism, to the discovery of gross imposture in connection with the same, and to the strange hallucinations, in regard to this subject, which have overtaken even men who have no mean pretensions to the name of scientists. We have just seen a *resumé* of the history and theories of supernatural appearances and influences, in the second volume of the new edition of the *Encyclopædia Britannica*, a work which is generally regarded as an unusually high authority. The article to which we refer traces the origin of and reasons for superstitious beliefs, considers the evidence for the reputed appearance of ghosts, and concludes with the principal arguments for and against the creed of the spiritualists. The writer of the article evidently considers the strength of the argument, in favor of spiritualism, to consist in the character of a few of its supporters, men like Mr. Wallace and Mr. Crookes in England, and Robert Dale Owen in this country. Reference is made to the experience of Mr. Crookes, who not only saw a spirit, but clasped it in his arms, and thus demonstrated its substantial existence; and the conclusion to the whole matter is that spiritualism, even if its principles are not fully proven, is still a fair subject for scientific investigation, with a reasonable presumption in its favor.

We have referred to this article in the *Encyclopædia Britannica* because an opinion, such as that cited above, in a publication of such high standing, is worthy of more than passing notice. No matter how wonderful the events that are related by the fanatics who generally make up the congregation of spiritualists, their revelations have little effect on any one outside the circle of their immediate followers; but let a man of some scientific attainments, and, moreover, a member of the Royal Society, add his testimony to the truth of these events, and we see that he may deceive even the very elect. It was generally understood, when the last edition of the *Encyclopædia Britannica* was announced, that it was to be scientific in the best sense of the term, and, while giving due weight to popular beliefs and superstitions, that it would endeavor to sift away the chaff with which many of them are enveloped, and reveal their real character. We are to understand, then, from the article under consideration, that such investigations as have been made by some of the more distinguished converts to spiritualism can properly be classed under the head of scientific experiments, which, while not perhaps absolutely conclusive, leave the matter *sub judice*. When we remember the character of the evidence on which all the modern miracles depend, the difficulty if not impossibility of making a thorough investigation with the facilities afforded at a *séance*, and the complete exposure of all the notorious cases of spiritual visions, our readers will probably venture to doubt whether the treatise on "Apparitions" in the *Encyclopædia Britannica* either gives a clear understanding of the actual facts connected with spiritualism, or represents in any sense the views of scientists generally in regard to the matter. No mention is made, for instance, of the exposure of the Katie King fraud in this country, while the vision of this airy being, produced in England under the auspices of the same mediums, is given as one of the strong arguments for allowing spiritualism to have a standing among scientific men. For our part, we can say that we have never heard of any event at a spiritualistic *séance* that at all approached the movements of the wonderful Psycho, in London, whose *rationale* escaped detection for months, with exhibitions in open day, and with apparently every facility for investigation that could be desired.

#### PROSPECTS OF SCIENCE ON THE PACIFIC SLOPE.

The conditions for the advancement of Science beyond the Rocky Mountains are peculiarly favorable. The country itself presents an exhaustless field of research in every department of the physical and vital history of the world. Its records of continental upheaval and subsidence, of ancient rivers and vanished seas, of vast volcanic outpourings and vaster scenes of erosion, are wonderfully full and legible. In the beds of its tertiary lakes are the remains of multitudes of the progenitors of recent forms of animal and vegetable life—inexhaustible mines of material for the solution of the great problems of evolution. On the shores of those lakes and rivers dwelt the most ancient races of men that geology has furnished glimpses of. Already abundant traces of them have been discovered in and beneath the later tertiary strata, and it is not unreasonable to hope that future observation may connect them with the post-glacial founders of the civilizations which grew up along the valley of the Colorado, before that strange river had sunk its channel a mile below the surface of the plain it once watered, probably before the Nile spread its first layer of fertile soil over the foundation sands of ancient Egypt. Chemical geology has already been immensely furthered by the knowledge gained through the mining operations of the interior and the investigations they

have inspired; while the demands for men of scientific training, incident to a country so largely given to mining, have secured to the Pacific Slope a proportion of scientific observers unequalled in any other country.

In older communities, Science and scientific thinking have to contend with the conservatism of custom and the traditions of scholastic culture; in the far west, where scientific training has been at a premium from the first, where public prosperity rests so largely on scientific operations, Science is likely to get more than its fair share of encouragement, rather than less.

In proof of this, it is necessary only to contrast the financial condition of the California Academy of Sciences with that of our eastern societies of like character. It is true that something more than money is needed for productive investigation: the natural and social conditions must be favorable, and there must be no lack of men of proper zeal and training to undertake the work. In this respect, as already noted, the Pacific Slope is as greatly favored as in its abundance of wealth; and only the grossest mismanagement of their means and opportunities can prevent the richest harvest of scientific achievement by the Pacific scientists, whether independent or connected with the California Academy.

The magnificent scope and execution of Mr. Bancroft's research, in connection with the native races of the Pacific coast, afford at once an illustration of the western way of working, and a model of thorough scientific investigation. We shall be greatly disappointed if Mr. Bancroft's work does not prove to be the first of a long series of correspondingly valuable researches in other departments of knowledge, undertaken by the scientific workers of the west. Hitherto their work has of necessity been chiefly of a practical, money-making sort. It has given them the best possible training for the conduct of investigations of broader scope and remoter profit. The work lies ready at hand; and it is safe to predict its prosecution with true western vigor and thoroughness.

#### DANGERS OF CHLORAL DRINKING.

Blessed be the man that invented sleep, said the immortal Sancho Panza. When the primary physiological effect of chloral was first made known, thousands called down equal blessings on the man who discovered that simple and seemingly harmless sleep compeller. No matter what cares made life a burden, no matter what excitements or excesses made a stranger of "tired Nature's sweet restorer," here was a painless key to the soothing realm of Morpheus, with no apparent penalties to pay for the invasion. It is not surprising, therefore, that chloral soon came to be employed, without medical direction, to a greater extent than had ever been the case with any other sedative.

But experience has not justified the implicit confidence reposed in it. Its apparent harmlessness only made the insidious effects of its daily use the more dangerous. Though it might not kill directly, it too frequently enabled death to take place from causes that would not have been immediately fatal without the sedative influence of the drug on processes needful for life; and not infrequently the machinery of life came to a stand under its influence when no other disturbing cause could be detected: more frequently, perhaps, the *Lancet* avers, than with the use of any other sedative except chloroform, with which it has many chemical and a few physiological relations. The danger of premature death, however, is not the gravest consequence of chloral drinking; and the *Lancet* editorially predicts that some day, when the punishment for the misuse of the drug falls upon some sensitive temperament and gifted intellect, we shall have the "Confessions of a Chloral Drinker," to take its place beside De Quincy's "Confessions of an Opium Eater."

There seem to be two sources of danger attending the habitual use of chloral. The most obvious arises from the fact that the sleeplessness which it is employed to remove is the result of improper living. The proper cure for the distressing symptom is a return to right living, which will never be done so long as the penalty is masked. Instead of curing the disease, chloral simply hauls down the danger signal and permits the wrong doer to hurry on to complete destruction. It is thus a delusion and a snare.

But this is not the worst. Chloral is itself a serious disturber of the vital economy, though its action is very slow. Healthy life is the attendant, if not the effect, of a properly balanced and correctly working organism. Any tampering with our physiological machinery, more especially if habitual, is of necessity mischievous; and the practice of chloral drinking is such an interference. We see its immediate effect in the phenomena of sleep; and there is an analogy, as the *Lancet* points out, between the temporary effect of a single dose, and the permanent effect of its habitual use.

"In sleep, the sensory recipient and lower motor centers are separated from those of consciousness and will with which, during the waking state, they are in close connection. This separation can take place only under certain conditions, which vary much in different individuals. Chloral introduces an artificial influence, and separates forcibly those functions of the nervous system which would otherwise have been linked together. It stills unpleasant emotion—removes disagreeable sensation—paralyzes the will. This can hardly occur repeatedly without some permanent effect. Each region of its influence presents an example of perverted action. The will becomes weakened, emotional manifestations are in the chloral drinker more easily produced; the evidence of the senses is perverted, and their action is no longer under the same control of associated impressions. All influences of a depressing character are felt more keenly. The sufferer becomes more 'nervous,' emotional, hysterical. Neuralgia and other sensory disturbances become frequent, and with them various

paretic phenomena depending chiefly on defective will. Ultimately still graver consequences may result. Delirium, imbecility, and paralysis of the pharynx and cesophagus are among the symptoms which have occurred in recorded cases, and which have ceased when the habitual dose was discontinued. All the time the supposed need for sedatives increases, the craving therefor may become as intolerable as for opium—the patient moaning for chloral which he can hardly swallow—while sleep gradually becomes impossible, except under artificial influence."

This is a serious showing for a drug popularly believed to be absolutely safe and harmless. And when we add, to its direct injuries to the nervous system, its indirect influence in perpetuating the unsanitary conditions and habits which lead to a resort to it, the need of caution in its use and the propriety of abstaining from its use except under medical advice must be apparent to the dullest.

#### COLLEGIATE RACES.

Now that the excitement of the intercollegiate regatta has waned, there will, we think, occur to many some sober second thoughts, regarding that and all similar competitions, which deserve more than a passing consideration. Physical pluck and endurance will always command admiration; but whether such qualities are to be considered superior to others which involve the higher attributes of the mind, so as to warrant their cultivation in lieu of or to the detriment of the latter, is a question which quickly suggests itself in view of the relative importance popularly accorded to the recent display of physical strength and to the several college commencements which lately have occurred. If the columns of the daily press are to be taken as an index, the meager space allowed to the reports of the latter exercises, and the almost unlimited enterprise exhibited in securing the most trivial particulars relative to the boat race and its participants, show plainly on which side popular interest is enlisted. Are we then to infer that superiority at the oar, or on the race course, is by the friends of education, as well as by the people generally, ranked higher than superiority in mental attainments? We hope not—we believe not—but then, are we not tacitly at least encouraging such a conclusion in the minds of the young men who fill our colleges?

There can be no gainsaying the fact that a certain amount of physical culture is a necessary concomitant to good health. A well balanced and healthy brain is rarely found in a weak and decrepit body. *Mens sana in corpore sano* is a wretchedly trite proverb, but none the less true; and certainly there is no class to whom its precept is more important than to those who in youth undertake a four years' course of study. But physical culture carried to excess is as bad as no culture at all, or even worse, since it may leave behind it, after severe exertion, injuries which are ineradicable: or Nature, strained beyond endurance may give way in the hour of trial, and, as in the case of Renforth the oarsman, death may triumph in the midst of the contest. Every account of the recent regatta and the subsequent foot races agrees in stating that, in very many cases, the marks of over training were apparent, facts abundantly proved by the fainting of some of the most muscular rowers, and by the pitiable condition in which, it is reported, several of apparently the strongest of the pedestrians concluded their efforts.

While it cannot be expected that young men will fail to be carried away by their own and by the intense popular enthusiasm manifested in these competitions, and thus rush to extremes both in the matter of physical exercise and in neglect of other duties, it is not to be supposed that the older and wiser heads of college authorities and of parents will countenance proceedings fraught with bad results. To the former, especially, the public looks for a wise guidance of those under their charge; and it is certainly as much their duty to impress upon their students the laws which govern health and correct living as those which underlie any department of knowledge. It certainly is their office to point out how far physical culture is beneficial as it is to show that its neglect is hurtful—to check it in one case as to encourage it in the other.

We are very much disposed to question the expediency of such contests as those now ended, and from another and different standpoint from that above taken. Their only advantages are an increase of *esprit de corps* among the students and the bringing of our educational institutions prominently to public notice. These, however, are more than compensated for by the highly demoralizing effect which they possess, in common with all races or chance occurrences upon which gambling can be based. It certainly is demoralizing for any body of men to be reduced to the level of the race horse or the dice box; and the fact that betting is not only indulged in freely by the students themselves, but freely countenanced by the alumni, is not at all calculated to improve the moral tone of the institutions in which young men are supposed to obtain the foundations for their subsequent careers.

#### The New York Dock Department.

George S. Greene, Jr., C. E., has recently been appointed Chief Engineer of the Dock Department of the city of New York, General Charles K. Graham having resigned. Mr. Greene, although comparatively young, is an indefatigable worker, a thoroughly practical, experienced engineer, and a man of spotless character. The appointment reflects credit upon the Commissioners by whom the selection was made. The administration of the Dock Department devolves upon a board of three Commissioners, namely, Salem H. Wales, formerly of the *SCIENTIFIC AMERICAN*, President, Jacob A. Westervelt, and Henry F. Dimock, all of whom are leading and influential citizens.