SCIENCE

FRIDAY, NOVEMBER 16, 1888.

THE DRIFT OF PUBLIC discussion in England, not only among scientists, but also among athletes and others interested in physical training, seems to be against the acceptance of Professor Roy's defence of stays and corsets, at the recent meeting of the British Association. Some of the leading journals of London were instant in their approval of Professor Roy's theories; but where they have done so, immediate protests have come from their readers. *The Spectator*, for instance, in a recent number, after quoting Professor Roy's assertion that the desire for waist-belts is instructive, and has been displayed by all athletes, and persons of whom exertion is required, since the beginning of history, adds, "It will be observed that this argument, which is certainly true of all runners, Asiatic or European, applies to men equally with women, though men gird themselves only to meet special calls upon their strength." To this a recent graduate from Cambridge, where he was distinguished as a runner and long-distance bicycle-rider, protests that neither runners nor experts upon the wheel, at that university, ever used, or showed a desire to use, tight waist-belts. On the contrary, it was their custom to gird themselves as loosely as possible in order to allow free movement of the diaphragm. If rowers even wear waist-belts, they are so loose as to cause no interference with the freest movements of all the muscles of the body. It is probable that the habit of "girding up the loins" preparatory to physical exertion originated in Oriental countries, where in ancient times, and now as well, the peculiar form of the prevailing costume made it necessary in order to secure free movement of the limbs. A custom once established, needs no further explanation. It may survive long after there is any reason for it. The Hittites wore peaked-toed, turned-up shoes thousands of years after their ancestors had come from the mountains of the north, where the form of their snow-shoes suggested the peculiar fashion; and the daily life of every people is full of instances that might be cited. Nobody to day places restraint upon any of his organs if he desires to excel in feats of strength or speed. He may wear a waist-belt, but it is never so tight, as has already been remarked as to rowers, as to interfere with the free play of the muscles.

THE VERY ABLE PAPER on hydraulic degradation, by Director J. W. Powell, published elsewhere in this issue of *Science*, is the result — it would not be safe to say 'the final result' — of more than a dozen years of study and observation upon the subject. Former publications have simply indicated the direction in which this investigation was proceeding, and announced some of the conclusions reached. This is a comprehensive, brief, pointed, and easily understood exposition of the whole subject. *Science* congratulates itself upon being the first journal of its class, or of any class, to present this admirable paper to its readers. Major Powell is understood to invite comment, criticism, and discussion of the paper, and *Science* will gladly open its columns to communications on the subject.

THE APPROACHING RESIGNATION of Dr. John B. Hamilton, Surgeon-General of the Marine Hospital Service, to accept the editorship of the *Journal of the American Medical Association*, adds another to the frequent examples of the difficulty of retaining the bright men of science in the public service. During the last ten years Dr. Hamilton, by his energy and intimate knowledge of the service, has been able to carry out many reforms that could not otherwise have been effected. One very important one is the examination of pilots for color blindness, the establishment of new hospitals, the perfecting of the hospital regulations, which amounted to a thorough reorganization of the service and its general advancement, until, as *Colburn's United Service* (London) has declared, it is "the gem of the mercantile marine of the world." The means of preventing the spread of epidemics have been so simplified by Dr. Hamilton that most places subject to epidemic visitations have practically adopted the methods brought into use in this country by him. Dr. Hamilton's remarkable energy will soon make its effect felt in the pages of the *Journal*. Nothing is slow or dull that he has to do with, not even a medical journal. He will force others to quote from him, instead of making the *Journal*, as too many similar publications now are, a judicious selection of extracts from the exchanges. His Washington friends, of whom there are many, for he is personally very popular, will regret the loss of his society, but rejoice at his promotion.

THE LAWS OF HYDRAULIC DEGRADATION.[1]

THE lands of the earth are degraded by water, by ice, and by winds; hence in discussing geological degradation it becomes necessary to recognize hydraulic degradation, glacial degradation, and æolian degradation.

In hydraulic degradation three methods may be distinguished. 1. The surface of the land is disintegrated by various methods and washed away by rains and melted snows. The rains gather into streams, as brooks, creeks, and rivers, and transport the disintegrated rock from one region to another. This general surface degradation may be called 'erosion.' 2. During the process of this transportation the streams carve channels for themselves, and this channel-cutting may be called 'corrasion.' 3. By erosion, and also by corrasion, cliffs are produced, and these cliffs are broken down by gravity. This method of degradation may be called 'sapping.'

Thus there are three methods of hydraulic degradation, — erosion, corrasion, and sapping.

There are three processes involved in erosion: (*a*) the rocks are disintegrated; (*b*) the disintegrated material is transported in water; (*c*) in order to be transported in water the material must be loaded. In like manner, there are three processes in corrasion, — disintegration, loading, and transportation. In sapping there are but two processes, disintegration and falling.

In erosion and corrasion the material which is transported may be called the 'load.' The load is transported by two methods, a portion floats with the water, and another portion is driven along the bottom. The water in which the load floats is the 'vehicle' of transportation. Gravity is the force of transportation, and acts alike on the water and on the load. In the same sense that the water furnishes its own moving force, through its inherent gravity, so the floating load furnishes its own moving or transporting force through its inherent gravity. Vehicle and floating load alike are moved by gravity. The vehicle can move without the floating load, but the floating load cannot move without the vehicle; that is, the water is the agency of flotation for the load.

The floating load is in general of greater specific gravity than the water, and while floating, it falls to the bottom and comes to rest, and the progress down-stream of the floating load ends. The excursion which each particle will make from the time it is loaded to the time it is deposited depends upon four conditions: First, specific gravity. If the specific gravity is greater, the particle is deposited sooner; if the specific gravity is less, the particle is carried

[1] A paper read before the National Academy of Sciences at its meeting in New Haven, November, 1888.