

SWIMMING.

Mr. Paul Boyton's feat of crossing the English Channel by the aid of a life-preserving dress tends to prove the value of a knowledge of how to swim almost as much as it does the efficacy of the invention tested. While the dress afforded buoyancy to his person, the wearer, through his expertness as a swimmer, knew just how to use his members so as to aid in his propulsion, with the least expenditure of power. The season is now at hand when the water becomes sufficiently warm to allow of bathing at almost any hour of the day, and hence the present is an excellent time, for those who contemplate acquiring this very necessary part of the knowledge of self-protection, to begin.

The manner of swimming properly is as follows: Supposing the bather to be in the water, he throws himself forward on his stomach, his whole body being only just covered by the water and no more; his hands are brought up under the chin, knuckles upward and with the first fingers touching each other: the whole palm is slightly contracted so as to form a concave surface, and the fingers are pressed closely together. The legs are drawn up as short and as near the body as possible; the breath is fully inhaled; then the stroke is made; the hands and feet are both darted forth to their fullest stretch at the same moment; the for-

mer are still kept close to each other, and the balls of the toes are made to touch, in which position they remain unmoved till the whole stroke is finished. The hands, fully extended, are then separated and moved round, each describing part of a circle till they are opposite the shoulders, and then the stroke is finished. But observe that which is of most consequence; the exhalation of the breath begins with the stroke, and is slowly continued as long as the striking lasts; indeed, the quantity of breath determines how long the stroke will be, for it is taken only once at every stroke. It is very measurably given out by a good swimmer, and all the time he is breathing forth he brings his hands round, making the lungs and the hands work and cease working together. The legs all the while, after the first rapid kick, remain stretched out rigidly, with the heels quite close to the water surface; thus a flat position is secured, which greatly conduces to speed.

The hands are only slightly propulsive; their chief use is to act as a cutwater, cleaving the way for the body, but, much more, to prolong the impetus given by the legs, and to eke it out to the utmost. The breath acts as a float to the whole, and cannot be too carefully husbanded and proportioned to the long sweep of the arms. A swimming stroke resembles that of an oar in its perfection; for it is quick forward, evenly pulled out, and the recovery for a new stroke is rapid; and on these two things, namely, lying truly horizontal just under the surface of the water, and proper treatment of the breath, the art of swimming depends.

In entering the water head foremost, or "taking a header," as it is called, the water should be struck by the forehead bone, just below the hair—the hands having first cloven the water, as shown in the illustration. The angle which the body should form with the water should be less than half a right angle, or from thirty-five to forty degrees, as shown in the diving figure in the annexed engraving, selected from the *Art Journal*. Then recovery upwards is rapid, and the appearance of the whole graceful. Adept has brought this branch of the art to such perfection that they can jump into less than two feet of water without touching the bottom.

In fresh water a strong swimmer will move fully five feet and a half at every stroke without great exertion. How many strokes he will make in a minute must depend on his breathing capacity; twenty-five to twenty-six would probably be the average. This will give fifty-eight yards per minute, or just two miles an hour; and we should think, to accomplish that pace without distress would be a fair criterion of a good

swimmer. At a racing pace the strokes are much more rapid, exceeding fifty per minute; and the highest speed that seems attainable is thus eighty-eight yards, or exactly three miles an hour.

Mastodon for Yale College.

Professor Marsh has secured, for the Peabody Museum of Yale College, the skeleton of a large mastodon, exhumed by Mr. A. Mitchell on his grounds at Otisville, seventy-five miles from New York and within a mile and a half of the Erie railroad. The bones were found on and in clay, beneath a

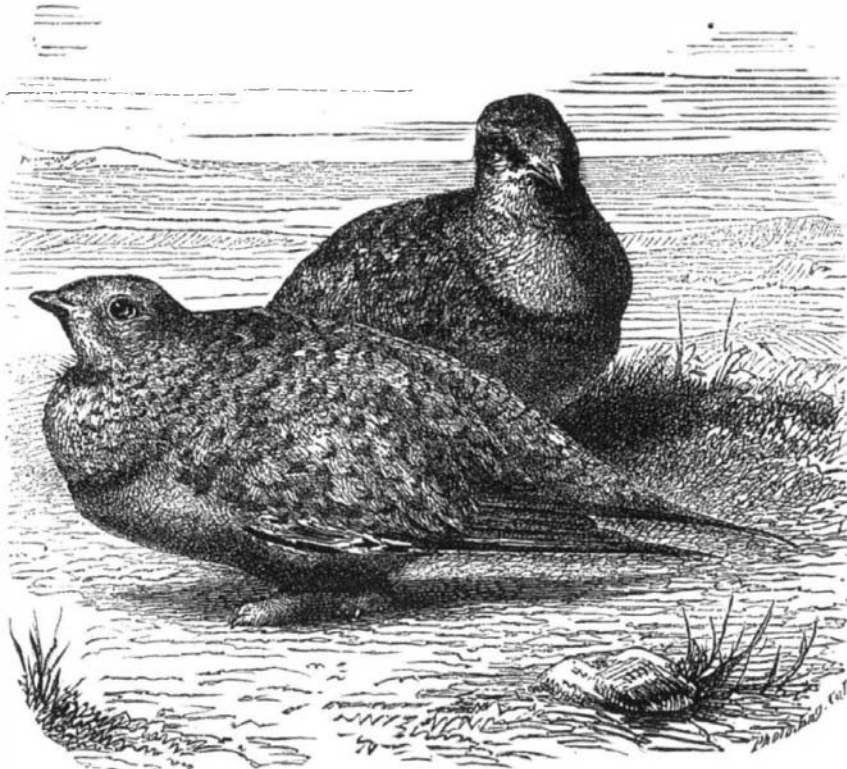


BOYS LEARNING TO SWIM.

deep bed of muck, and are in an excellent state of preservation. This Otisville mastodon is the sixth that has been found in the swamps of Orange county, N. Y.

THE GROUSE FAMILY.

Of the many feathered races that afford beauty to our moors and woodlands, sport to our gunners, and food to our tables, the grouse is one of the most distinguished. There is a great variety of birds known under this generic name, including species widely different, as for instance the ptarmigan and the black cock, or the capercaillie and the cock of the plains. The sand grouse (*pteroecles*) is found in the arid deserts of Asia and Africa, also in Southern Russia. The wings are long and pointed, and the powers of flight are exceptionally



THE SAND GROUSE.

great; and the toes are connected by a membrane, enabling the birds to run rapidly on loose sand. Their plumage is variegated, brown, gray, and ochreous yellow being predominant. Though the birds associate in pairs, they are often met with in flocks, and they are striking objects on the wing, being beautifully marked. Their flesh is, strange to say, coarse and flavorless.

The hen lays her eggs in a hole in the sand, and hatches

out her young, which are soon able to obtain their own living, being strong and hardy.

The British Telegraphs.

From the annual report of the Post Office Department of Great Britain, just rendered to Parliament, we gather that the total receipts for telegraph service for the year ending March 31, 1875, was \$5,600,000, and the expenditures for the same, \$5,965,300, showing a net loss of \$365,300. The Chancellor of the Exchequer, referring to the telegraphs, in his speech on the budget, took a rather gloomy view of what he

termed a remarkable experiment, and held the results up before the House as a warning not to enter into any other kind of business which could better be carried on by private enterprise. He said: "Undoubtedly the telegraph service has not yet been brought into a remunerative condition. We are not as yet paying our way, and are contributing very little toward the interest on the debt incurred for the purchase."

The telegraphs of Great Britain have already cost that government about \$60,000,000, and there are claims still pending which will amount to several millions more. Every year the deficiency has been enormous, to say nothing of the loss of interest upon so vast a sum. This latter item alone, at the low rate of 3½ per cent, amounts to

\$2,100,000 yearly. At the prevailing rate of interest in this country, 7 per cent, this loss would, of course, be twice as great. All of this has to be met, and there is but one way to meet it—by increased taxation. In this manner the burden of affording telegraphic facilities at less than cost, to the one per cent of the population whose business necessitates their use, falls upon the ninety-nine per cent who do not use the telegraph at all.—*Journal of the Telegraph.*

How Inventions are Made.

The life of George Stephenson proves that, notwithstanding the novelty and great importance of his improvements in steam transit, he did not discover these improvements. He did not discover that a floating embankment would carry a railway across Chat Moss, neither did he discover that the friction between the wheels of a locomotive and the rails would enable a train to be drawn by tractive power alone. Everything connected with his history shows that all his improvements were founded on a method of reasoning from principles, and generally inductively; to say that he "discovered" our railway system, according to the ordinary construction of the term, would be to detract from his hard and well earned reputation, and place him among a class of fortunate schemers who can claim no place in the history of legitimate engineering.

Count Rumford did not by chance develop the philosophy of forces upon which we may say the whole science of dynamics now rests; he set out, upon a methodical plan, to demonstrate conceptions that were already matured in his mind, and to verify principles which he had assumed by inductive reasoning.

The greater part of really great and substantial improvements which have performed any considerable part in developing modern mechanical engineering have come through this course of first dealing with primary principles, instead of groping about blindly after mechanical expedients; and present circumstances point to a time not far distant when chance discovery will quite disappear.—*Engineering.*

Mastic for Iron and other Materials.

The following is the composition invented by M. I. Machabee, which is said to preserve iron from rust, and also to be applicable to other materials, such as stone or wood, used in conjunction with iron or other metal, in the formation of reservoirs or other works: Virgin wax, 100 parts; Gallipoli, 125; Norwegian pitch, 200; grease, 100; bitumen of Judea, 100; gutta percha, 235; red lead, 120; and white lead, 20, all