GLACIERS.

Among the most remarkable objects on the surface of our earth are the great rivers of ice that are forever slowly creeping down the valleys of the Alps. The globe on which we live is sweeping through a region of intense cold, the warmth which is essential to animal life extending at farthest but a few miles from its surface. The rays of the sun, which produce the heats of summer, pour through the cold space above without leaving in it any traces of their power. The water which is evaporated from the ocean and rivers, as it floats upward into the cold region, is there condensed, and, falling upon the summits of the mountains, covers them with deep layers of perpetual snow. As the snow accumulates in vast masses in the valleys which furrow the steep sides of the mountains, it is pressed downward by its own weight along the valley, and when it reaches the boundary of perpetual frost, it is converted into clear solid ice. From what we know of the properties of ice we should suppose that a mass of it hundreds of feet in thickness, wedged in between the rocky and ragged sides of a crooked valley, would remain immovably fixed in its position; but careful and repeated experiments show that this is not the case. Professor Forbes, of Edinburgh, by placing rows of stakes across a glacier and observing them carefully with a theodolite, ascertained that the whole mass was moving slowly and steadily downward, at the rate of a few inches only in 24 hours.

Within a few years glaciers have been thoroughly investigated by Agassiz, Forbes, Tyndall and many others, and hundreds of observations of their motions and phenomena have been made with suitable instruments. It is found that the motion is more rapid in the middle than at the sides, at the surface than at the bottom, in the summer than in the winter—and like rivers of water, glaciers move the most rapidly in the steepest part of their course, the motion becoming very slow indeed where the ice spreads out to fill a broad part of the valley. When the earth falls down from the sides of the valley upon the edges of the glacier, it rests there, forming long lines or walls, which are called *moraines*. When two streams of ice unite, the moraines upon the contiguous edges come into the middle of the combined stream, and thus the glacier in the lower part of its course becomes marked with rows of earthy matter and broken rocks extending lengthwise along its surface. When separate masses of rock roll down from the sides of the valley and rest upon the ice, they protect the ice directly beneath them from the action of the sun's rays, and as the surface around is melted away, these rocks remain lifted up on short pillars, presenting a very singular appearance. Isolated masses of gravel also protect the ice from melting, and when that around melts away, the mass falls into a conical form, and thus the glacier becomes dotted with cones of gravel the hearts of which are of ice.

As the glacier moves down the mountain into the warm regions, it is melted on the surface, and thus its vertical depth diminishes at its lower portion, though it generally terminates abruptly with an end of considerable thickness, a stream of water usually flowing out of a deep cave in the end. In summer this end melts more rapidly than the glacier moves down, and the terminus retreats up the valley; but in winter the head of the frozen monster is pushed downward along the valley, plowing up the ground, tearing trees from the earth, and sometimes crushing in the walls of houses.

The Himilayas and other mountains which rise into the regions of perpetual frost produce glaciers, as well as the Alps. Near the pole, the glaciers are sometimes pushed quite into the sea, when their ends break off and float away, forming the icebergs, which are occasionally encountered on the voyage from this country to Europe.

Col. C. W. Saladee, patentee of the steam plow illustrated in No. 10 of the present volume of the Scientific American, writes us from Texas that he is about to start for Philadelphia, where he is having a full-sized operating machine constructed. He desires that communications may be addressed to him at the Merchants' Hotel, Philadelphia, for the next ninety days.

A single patent in England for fishing rail-joints saved $30,000,000 to the public in 14 years.

HALE'S MODE OF IMPELLING SHOT AND SHELL.

The famous congreve rocket, which was invented in 1804, was condemned by the Duke of Wellington as being more dangerous to the army that used it than to the enemy, from the uncertainty in the direction of its flight. It has often occurred to us that the principle of propelling rockets might be applied to cannon shot, in connection with a tube of sufficient length to insure the flight in the desired direction, and we here illustrate a plan invented by Mr. William Hale, of England, for accomplishing this.

The rocket-shell is represented in Figs. 1 and 2. The shell, *a*, has a long iron cylinder, *b*, attached to its rear end; this cylinder being filled with meal powder, *e*, compressed, so that it will burn slowly. The burning of this powder generates hot gases which exert a powerful pressure against the whole interior of the cylinder, and by making holes in the rear end of the cylinder, a portion of the pressure is removed from this part, leaving the pressure against the forward end not fully counterbalanced, which accordingly drives the missile forward in that direction. A central rod, *d*, holds the plate, *f*, securely against the rear end of the cylinder, and serves to distribute the propelling powder in the annular chamber around this rod. A space is left within the cylinder around the outside of the powder, so that the powder may burn from its external surface inward, and when the fire reaches the central rod, it lights a fuse which explodes the powder in the shell.

Fig. 2 *Fig. 1*

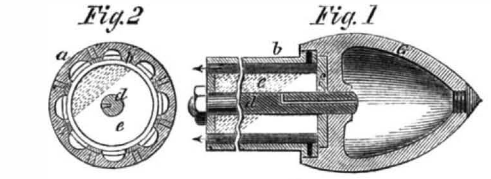

Fig. 3

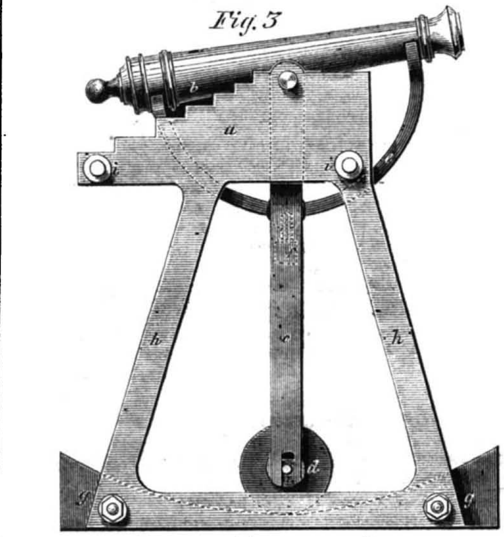

Fig. 3 represents the apparatus for starting the shell in the desired direction of its flight when used on board ship. A slit is made through the deck, *k*, of the vessel for the sliding back and forth horizontally of the frame, *h h*, and pendulum rod, *c*; the gun, *b*, being supported on the rollers, *i i*, which run upon the deck by the sides of the slit. A curved railway *g*, is fitted to support the rolling pendulum, *d*, so that as the vessel rolls, this heavy pendulum will preserve its vertical position, and thus keep the gun in a horizontal position, or at any angle of elevation desired.

Mankind were never more earnestly engaged in improving instruments for destroying each other than they are at the present time.

Improved Mode of Extracting Phosphorus from Bones

Le Génie Industriel describes a process recently patented by Mr. Cari Mantrand, of Paris, for extracting phosphorus from bones more economically than by the processes heretofore employed.

The calcined bones, reduced to a fine powder, are mingled with a sufficient quantity of pulverized charcoal to combine, as carbonic oxyd, with all the oxygen of the phosphate. The mixture is placed in an earthenware cylinder varnished on the inside, filling the cylinder to three-fourths of its capacity. The cylinder is then heated red hot, and a current of hydrochloric acid gas is blown into it. The phosphate of lime is immediately decomposed, forming chloride of calcium and carbonic oxyd, while the liberated phosphorus is evaporated and driven through a copper tube, which leads into a vessel of cold water where the phosphorus is condensed.

The chloride of calcium, disembarrassed of the charcoal, in contact with sulphuric acid, regenerates hydrochloric acid for a new operation.

The labor of pulverizing the bones may be saved by digesting them with a solution of hydrochloric acid; using for this purpose the water of the condenser from the preceding operation.

In a communication to one of the London periodicals, Mr. Wm. Bridges Adams, a writer upon practical subjects, states that the earliest iron vessels constructed on the Clyde were large, flat-bottomed, wall-sided, open troughs of sheet iron, rivetted together at the seams, precisely like a long tank fitted with a wooden lid in the shape of a deck. Had such a vessel been required to boil a whale entire, it would have formed an admirable kettle by simply removing the deck.

In his report of the London Fire Department for 1860, the engineer states there were 54 incendiary fires during the year.

FROM THE STEAM PRESS OF JOHN A. GRAY.