

THE FISHERIES EXHIBITION, LONDON.

Among the interesting novelties at the Fisheries Exhibition, London, besides the American gaslight buoy, and the pneumatic alarm buoy, is Capt. Cator's tidal buoy, which we here illustrate. It is arranged something like a ship's log, and is towed astern of a vessel in the same manner. The motion causes the screw upon the buoy to rotate, the number of revolutions varying, of course, with the speed of the ship. Connected to the spindle of the screw is a hammer which strikes a gong. A number of these buoys are used in the British navy, their special object being to denote to another vessel astern the speed of the one ahead. This is readily ascertained by counting the beats of the gong per minute.

They are intended to be used during the prevalence of fog, and although they may be serviceable for squadron evolutions, would we imagine, be of much good to the passenger marine.

A Signal Station at Mount Whitney.

The Government has determined to establish a signal service station on the summit of Mount Whitney, and during the coming summer a detail from the engineer corps at the Presidio will be sent thither to make the necessary survey for that purpose. Mount Whitney is supposed to be the highest peak in the United States, having an altitude of 14,998 feet above the sea level. It is described as "the culmination point of an immense pile of granite, which is cut almost to the center by numerous steep, and often vertical canyons." It is situated on the west border of Inyo County, Cal., near the center of the Sierra Nevada, and about 325 miles south-east of San Francisco.

The station will have an elevation more than double that of the station on Mount Washington, New Hampshire. At the latter station the winter gales attain a speed of 100 miles per hour. As the data on which storm predictions for this coast are obtained from stations north of San Francisco, that on Mount Whitney will not be as useful to this coast as the Mount Washington station is to the eastern seaboard. It will, however, serve for many important scientific purposes. The signal station at Point Barrow, the most northerly extremity of the western coast of North America, latitude 71° 24' N., is to be abandoned, and a vessel will be sent up next month to remove the party stationed there. There the winds in winter blow with a speed of over 100 miles per hour, and the mercury sinks below 50° below zero.

DREDGE FOR SHELL FISH.

The novel dredge shown in the engraving resembles in some respects a potato digger. It has a plow to run under the sand, a grating for raising the shell fish out of the sand, and a wire net or bag to receive the shell fish, while allowing the sand to wash through. The plowshare is jointed to the grating, and the forward end of the plow beam is provided with an axle having two ground wheels for guiding the plow and limiting the depth of the cut. Near the forward end of the plow beam there is a bent lever, having at the lower end a shoe for riding on the sand, and at its upper end an eye for receiving a cord which runs under a pulley and thence forward, upward, and out of the water. By pulling this cord, the shoe is thrown down so as to raise the plow beam and cause the plow to run on the surface.

This is an improvement over the present system of dredging shell fish. Mr. Augustus F. Friend, of Gravesend, N. Y., is the patentee of this invention.

What is Carbon?

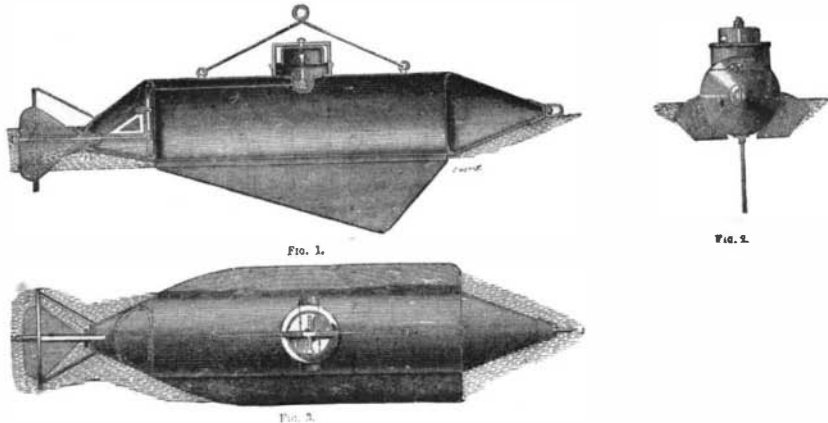
M. Berthelot, in the *Journal de Pharmacie et de Chimie*, treats of the elementary constitutions of carbon in a somewhat novel style. He says that from certain peculiar physical relations he is inclined to think that the true element of carbon is not yet known, and that it will eventually be found that graphite and diamond are not really identical, but are substances of a different order. M. Berthelot alleges that elementary carbon ought to be gaseous at ordinary temperatures, and that the various kinds of carbon which occur in nature are in reality polymerized products of the true element of carbon. Spectrum analysis is considered to confirm this view; for a spectrum recognized along with that of hydrogen in the light of comets is held to indicate a gaseous carbide, probably acetylene. If this hypothesis should be maintained by further research, it will be shown that the claim advanced on behalf of hydrogen to be considered as the fundamental element of the universe must be modified to embrace carbon. The spectrum in question is also shown by the Geissler tube.

ENGLAND, with 27,000,000 inhabitants, has only 140,000 residents of foreign birth; Germany, with 45,000,000, only 270,000; while France, with 37,400,000, has more than a million. In France there has been an increase of 200,000 in the last five years.

Fishing with Otters and Cormorants.

There is probably no known way of fish catching with which the Chinese are not familiar, and there are still some novelties to westerners in this ancient civilization. A very peculiar method is practiced by the natives on the Yungtsze River, opposite Tchang, viz., that of employing the common otter to drag the finny denizens of the muddy deep from their otherwise impregnable retreats under the high, overhanging cliffs.

From a cleft in the rock strong but slender bamboo rods project out over the water, to the extremity of each of which is attached an otter by an iron chain fastened to crossed



CAPT. CATOR'S FOG ALARM BUOY.

leather thongs round the animal's chest and immediately behind the shoulders. When resting on the bamboos, curled or doubled up, they look inanimate, and would be taken for dried skins hanging in the sun, but when required for use they are aroused to a great state of activity.

A large net is prepared with leaden weights and so sunk as to cover a considerable space of the bottom, the otter being placed under it before lowering. When once down the slaughter begins, and all unfortunate idlers are nabbed and rendered helpless by the sharp teeth of the savage animal. After a few minutes have passed the whole contrivance is hoisted up, the otter is chained to the rod, and the fish put into baskets.

Some of the otters are not in use, and it is a curious sight to watch them gamboling about as far as the iron chain will allow, splashing and diving and fighting each other.

A prominent English sportsman remarked, upon hearing this account:

"If you were to send it to the *Field*, they would certainly say you 'were a liar,' but it is hoped that the *Angler* will be quite convinced of the veracity of the tale and of the *veracity* of the otter."

A daily sight at the long bridge (Bridge of Ten Thousand Ages) over the River Min, at Foo-chow-foo, is the fleet of rafts engaged during the high water period in fishing with the aid of the cormorant, or searaven (family of *Pelecanidae*).

The rafts are frail, light structures, composed of five long bamboos lashed together. Only one man can go on each, armed with a paddle, boat hook, and long handled net with a basket for holding the fish. The tide is very strong in the

rapidly under water, is gone about a minute, and brings up a fish in its beak, and then the paddling commences, and after a short chase the pair are hauled in by the net and the game secured. The bird is then rewarded with a tiny fish to satisfy its appetite, and launched again into the foaming current. It is wonderful to see the agility of the boatmen in keeping clear of the bridge piers during this operation; how his swift paddle catches the water and his boat darts in and out across the rips like a live thing, half under water yet floating bravely.

The poor cormorants look drenched enough as they sit waiting to be tumbled in, but they are at home when overboard and never make a miss if once a fish is sighted. A metallic ring around their necks prevents them from swallowing the larger fish, but they get a feed of the small fry on the raft and in an hour or less are not inclined to work, and must have rest till another day. Sometimes two or three of the cormorants will pounce upon one large fish, and the battle that ensues is very exciting. One bird is sure to get it, and then the others follow, trying to wrest it away, the fishermen following swiftly to bag the lot. At such times the interest of the numerous spectators on the bridge increases to shouting, and the birds get ferocious to go in again. A well trained bird will thus capture about twenty large fish in an hour, and the man will gain about a dollar by the sale of them.

The cormorants are captured when young, and are kept in wild, marshy places, fenced in for use when required, on the river. One never tires of watching them at their daily task.—*Junio, in the American Angler.*

Hong Kong, March 27, 1883.

Headwaters of the Arkansas.

The Arkansas River rises in the Tennessee Pass, nearly west of Mount Lincoln, in latitude 39° 21' and longitude 106° 19', and flows a little east of south for a distance of about eighty miles in a straight line, when it flexes to the east, and flows through a deep canyon in the granite, and emerges into the plains near Canyon City. Near the junction of the east branch of the Arkansas, the valley, with the terraces on either side, continues pretty regularly about five to eight miles in width, but gradually closes up again below Lake Creek, though on either side are vast deposits of the coarse drift material extending high up on the mountain sides, especially on the west side of the valley. The valley then gradually expands out and enlarges, about five to ten miles in width, for a distance of nearly forty miles.

On either side of the valley small streams flow into the main channel of the Arkansas, from the source to Canyon City. These streams usually have their origin at the very crest or water divide of the two ranges, and, in most instances, have cut their way through the solid mass to the main river. Many of these streams have numerous side branches, which have also carved out wonderful gorges near the crest of the mountains, giving to these mountain ranges a ruggedness that is almost inconceivable to one who has not actually explored them. It is in the study of these

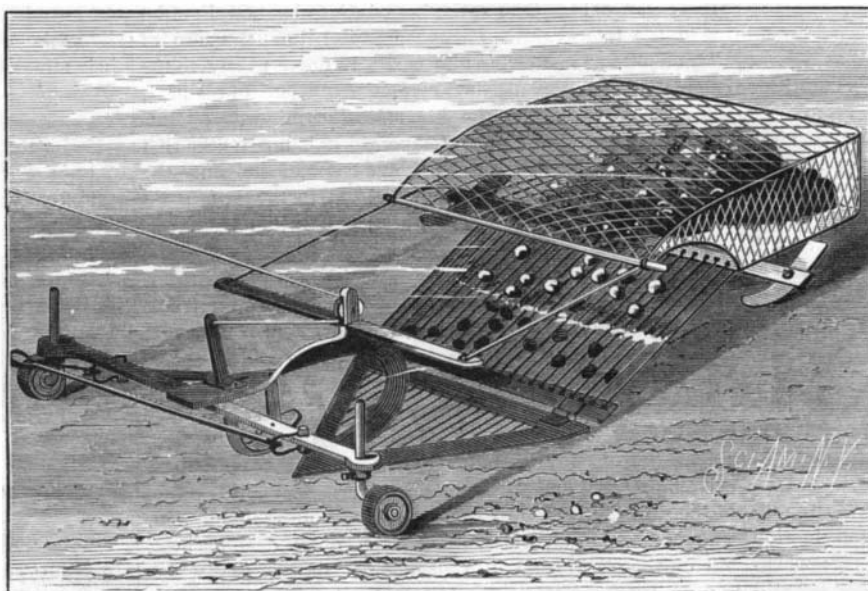
gorges that the geologist learns to appreciate the immense results of erosion in giving form to the rocky range of the West. Even yet the power of this force has not been adequately understood, but the wider our range of observation, the greater is our conception of its power. We may safely assert that at some period comparatively modern, 10,000 or 15,000 feet of sedimentary beds extended uninterruptedly from the South Park across the interval now occupied by the Sawatch range, all of which but insignificant remnants have been swept away, while a mass of the granite nucleus, of inconceivable dimensions, has also been removed. The general elevation of the Sawatch range for sixty to eighty miles is 13,000 to 14,000 feet above the sea at this time, and it is highly probable that hundreds and perhaps thousands of feet have been removed from the summit.

In 1845, Fremont, at that time a lieutenant in the Corps of Topographical Engineers, skirted the northern border for a short distance. He came up the Arkansas

River, crossed the main divide at Tennessee Pass, and traveled down Eagle River as far as the mouth of the creek. Here he crossed the river and took the trail over to White River, which stream he followed down some distance, then crossed the country to the Green River, thence to Salt Lake City.

The pass was named after General Fremont. The Arkansas River is, next to the Missouri, the largest affluent of the Mississippi. It rises at the west central part of Colorado, and its length is 2,170 miles. It is navigable for steamers 800 miles from its mouth, during nine months of the year.

THE white perch of the Ohio are noted for the musical sounds they make. The sound is much like that produced by a silk thread placed in a window where the wind blows across it.



FRIEND'S DREDGE FOR SHELL FISH.

vicinity of the bridge, and the utmost dexterity is required to prevent the slender rafts from overturning, but the fishermen are quite accustomed to being thrown into the water, and so evince no fear.

The cormorants are extremely voracious and are purposely kept in a state of hunger, so that their natural instinct will induce them to dive for their prey. Each raft is provided with two or three birds, and the sport begins.

The birds are apparently very dull and stupid as they crouch down on the raft, and look like a lot of dirty old geese, but once launched into the water they show amazing activity, and prove that their stupidity is only assumed. How they manage to see the fish under water is a mystery, for it is full of mud and of a dirty yellow color; but that there are fish you may quickly find out. The bird darts

Diving for Gold.

Perfect success has never attended the labors of the gold miner in trying to get gold from the beds of rivers when the water is flowing over the bed. Rivers have been turned aside and wing-dams built, so as to get at the auriferous deposits, and river beds have been worked at low stages of water, but none of these devices for pumping up gold from beneath the river have been successful or practical. Large amounts of money have been expended on dredges and pumps for working river bottoms, and various plans have been adopted. In no case, however, has any money been made out of the operation. Still there are people who contrive to bring up gold from beneath flowing rivers, and make money by it. For instance, in the state of Cauca, Colombia, where there are many deposits of auriferous gravel, most of the small gulches and ravines have been worked out a hundred years ago, though more or less mining is still going on. Many large streams have auriferous beds, and the natives, unable to turn the course of the river, mine in a peculiar way. The women take a batea in their hands, and dive down in ten or fifteen feet of water, scrape the loose sand and gravel into it, and bring it to the surface. Then they climb on to the bank and pan it out. They get from a few cents to four bits a batea. Sometimes the men engage in this work, but it is mainly done by the women. After a dive, the latter sit down on the bank and smoke a while before going down again. They teach the children of twelve to dive for gold also. Sometimes rich pockets or deposits are struck. Nobody but natives engage in this sort of work. At the Saragossa, the Clara Creek, and the Tewe River a good deal of this mining by women diving is done. —Iron.

CLOTH DRYING AND TENTERING MACHINE.

The cloth drying and tentering machine shown in our engraving dries goods upon a similar principle to out door drying under the most favorable circumstances, that is, by evaporating the water in the cloth by a soft and even heat, and carrying off the vapor as it is formed. Cloth dried by it has the appearance and feel of cloth dried out of doors, while it is dried much more rapidly, at less expense, and without regard to state of weather. This machine also gradually and very evenly tenters the cloth to width desired, without injury to the fabric, and at the same time will stretch the goods lengthwise if required.

The wet goods are taken into the machine at the top in front, the operator standing upon the elevated platform. Steel tentering pins carried on endless chains at either side, engage the edges of the goods, and the goods are carried in, the chains are made to gradually diverge for a distance of 41 to 16 feet (according to size of machine), until the desired width of goods is obtained, this being under the immediate control of the operator. The goods are then carried twelve times back and forth the entire length of machine, through and among twelve rows of steam pipes, through which steam has a free circulation, producing a uniform heat throughout, and are then passed out dry at the bottom of front of machine, then up to and between a pair of suspended rolls to the folder, which lays them in folds on a table ready to be carried away. A current of air passes through the machine carrying off the vapor. The motive power is furnished by a compact pair of horizontal engines.

This machine is built by Kinyon Brothers, Raritan, N. J.

George Gifford.

Mr. George Gifford, a well known patent lawyer, died at his home in Jersey City, N. J., July 2, at the age of 72. Mr. Gifford was for many years counsel for the principal

sewing machine manufacturers, serving Howe, Wheeler and Wilson, Grover and Baker, and Singer in that capacity. He made a success of that department of legal practice at a time—twenty-seven years ago—when there were very few of the profession who made mechanics and the subject of the patent laws a special study. Mr. Gifford not only acted as counsel for the united manufacturers under the well known combination, but he was referee and judge between them in their separate capacities, enjoying their full confidence in every position.

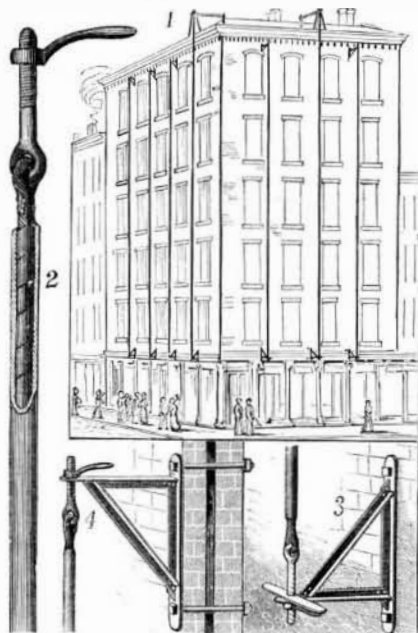
FIRE ESCAPE CABLE.

We give an engraving of a very simple, easily applied and efficient fire escape invented by Mr. A. O. Morford, of Portchester, N. Y.

The fire-escape cable is composed of a rope, preferably of wire, and an outer covering or cushion of soft rubber.

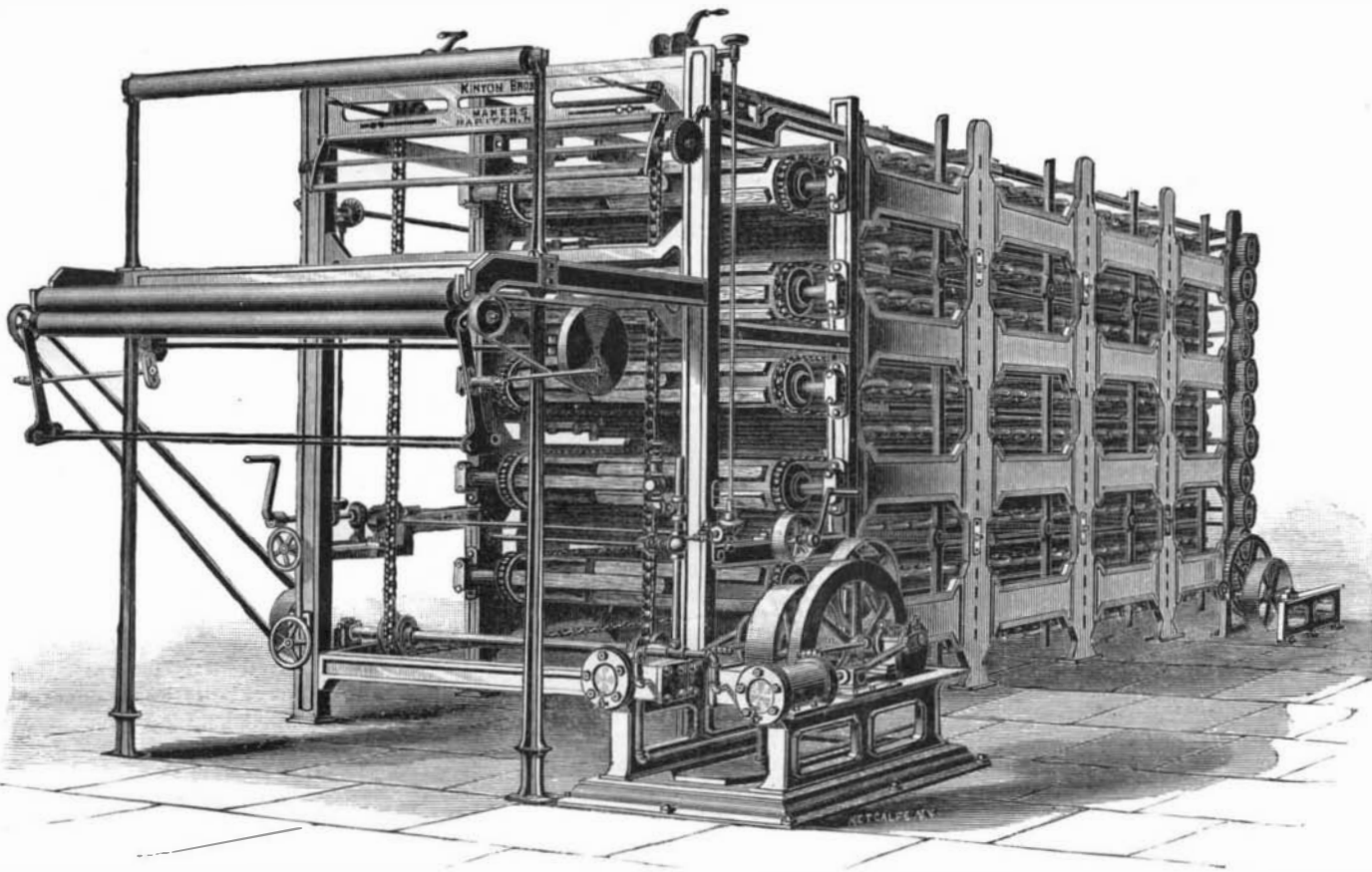
The cable is connected at each end with an eyebolt, as shown in Fig. 2. The eyebolts pass through brackets, Figs. 3 and 4, at the ends of the cable, and the nuts are screwed up tightly, making the cable taut.

In the form of cable shown the outer casing or cushion is a continuous tube of soft rubber drawn snugly upon the cable, but the covering or cushion may be composed of a strip of soft rubber wrapped spirally around the rope, with

**MORFORD'S FIRE ESCAPE CABLE.**

overlapping edges, which form spiral stop ridges or ribs. Where the edges of the strip of rubber overlap in wrapping the rope, a rubber or other suitable cement is applied to the covering for cementing the layers together, thus forming practically a continuous covering or cushion. In both cases the wrapping or covering of soft rubber will be of such thickness as not only to furnish a protection for the hands in grasping the cable, but a cushion into which the hands will embed themselves with but a slight grip, thus furnishing a firm and safe hold upon the cable with the outlay of but little strength, without cutting, burning, or otherwise injuring the hands, as would be the case with a naked rope.

In the spirally-wrapped form of cable the folds of the strip of rubber also furnish easy hand-grasps, and the ribs or ridges prevent all danger of the hand slipping upon the cable. Besides the advantage of a firm hand-grasp upon

**KINYON'S CLOTH DRYING AND TENTERING MACHINE.**

the cable, the soft rubber cushion enables the person descending to cling with his limbs to the cable, so as to cause a considerable friction between his clothing and the rubber covering, and thus diminish to a great extent the amount of strength required in the hands to effect a safe and easy descent. This fire escape is very cheap and may be readily applied without defacing the building. Its tensile strength is six tons, and the inventor informs us that sixty persons per minute can descend this escape. Further information may be obtained by addressing the inventor as above.

Rapidity of Cerebral Acts.

M. Albert Rene has, according to the *Revue Scientifique*, made a long series of experiments in the physiological laboratory of the Faculty of Medicine at Nancy on the rapidity of transmission of impulses through nerves, and the rapidity with which cerebral acts are performed. He finds that the intensity of the stimulus has a direct influence on the rapidity of nervous transmission. The stronger the stimulus the more rapid the transmission. The rate of transmission cannot therefore be stated in exact terms, since it is relative, as has been not unfrequently noted for other kinds of cellular activity. He has also confirmed the fact, now very generally admitted, that it is impossible to measure the rapidity of transmission in sensory nerves by stimulating different points of their length, for the rapidity of the response is not proportionate to the length of the nerve traversed. Thus the response to a stimulus applied to the fingers is often made with a shorter interval of time than a stimulus applied to the elbow or to the shoulder, though the length of nerve called into play is much greater in one case than in the other. In a word, it is impossible to compare the results obtained from different regions. The most exact method of measuring nervous transmission appears to be that of response to an auditory stimulus. The rapidity with which nervous impulses are here conducted he estimates at 28 meters per second, which is a little lower than the number obtained by other physiologists. For the rapidity of transmission of motor impulses M. Rene gives twenty meters per second, which is below that of experimenters, and notably below that of M. Chauveau. The duration of a cerebral act he estimates at thirty-five one-thousandths second. In young infants the duration is more considerable, amounting to 0.09 second. The duration of a reflex act—that is to say, the time occupied by the entire reflex arc, sensation, transmission to the cord, including motor impulse, and muscular movement—is 0.15 second.

A New Niagara River Bridge.

The Canada Southern Railroad Company have contracted for a bridge across the Niagara River at a point about 300 feet above the present suspension bridge, to be finished by the first of next December. The bridge will have a clear span of 500 feet between the towers on each bank and will be built of steel. It will be a cantilever truss bridge, wide enough for two tracks, and calculated to sustain the heaviest load that could be placed upon it by continuous trains of loaded freight cars. The cantilever style of bridge has never been used on very large structures, although several bridges of great length are now being constructed on this principle. Each shore section is supported by a tower at nearly its middle, or center of weight, the inner end being anchored and the outer end approaching a corresponding section from the other side. In this instance the projecting sections will be advanced 187½ feet each, making 375 feet together, and the remaining gap of 125 feet will be filled by an ordinary truss bridge resting on the ends of the cantilever spans. The steel towers supporting the cantilevers will be 130 feet high above the stone foundations, which will rise 50 feet above the water. The bridge will be stayed against the force of the wind, as well as supported from the towers, by wire cables.

Dullness in Woolen Manufacture.

From 250 requested replies to questions, received from the proprietors of woolen mills in New England, the Boston *Advertiser* ascertains that 759 sets of cards are stopped, equal to the consumption of 300 pounds of wool each, daily; in the aggregate, 230,700 pounds per day. Probably these re-

turns, which indicate a stoppage of more than one-third of the sets of cards in New England, are incomplete, and do not indicate the extent of the reduction, as no answers have been received from a number of letters of inquiry.

A NEW vegetable parasite, *Haplococcus reticulatus*, has been recently discovered in pork by Dr. Zopf. It occurs in from 30 to 40 per cent of the animals examined. Would it not be well if we paid more attention to the sanitary legislation of Moses, a fragment of the ancient medical law of Egypt?