

BRIDGE ACROSS THE BRITISH CHANNEL.

We have received the description and drawings of a projected bridge across the British Channel designed by a French engineer, Mr. Charles Boutet.

The bridge is to extend from the Dover Hills, near Shakspeare Cliff to Cape Blanc-nez, near Calais. The distance between these two points is 32,822 yards. Nine colossal iron piers and two abutments are designed to form the supports of the entire structure; so the bridge will have ten spans each of 3,282 yards, or almost two miles. The piers are to extend 120 yards above the sea level, to allow the largest vessels to pass under the bridge. Each pier measures at the lower end 130 by 87 yards, and the foundations reach from 28 to 52 yards into the ground. The piers are to be built on shore, and floated by immense buoys to their final resting places. They are at their lower parts, provided with screw supports, which, when turned, are worked into the foundation to secure and retain the piers in position.

Each cable consists of 120 two-inch wire ropes. Buffers made of wire rope, are arranged around the piers, to prevent vessels from striking against the same, and within each pier is a staircase, extending down to the water's edge, to serve as a means of escape for shipwrecked persons. Furthermore, each pier is constructed to be used as a light-house.

The entire expense of the structure is estimated not to exceed £8,000,000. One half of this sum we are informed has already been subscribed in France.

Interesting Researches upon the Effects of Lightning Stroke upon Animals.

Benjamin W. Richardson M. D., F. R. S., has been making extensive researches with the great induction coil at the Polytechnic Institution in London to ascertain the effects of lightning stroke upon animals with a view to throwing light upon some hitherto doubtful points connected therewith. The importance of being able to ascertain whether a person is dead or otherwise after being struck by lightning will not be disputed. Dr. Richardson asserts that it would be the easiest mistake in the world to look on a man struck by lightning as dead when in truth he is only stunned.

He says: I am free to confess, and it is right to confess, I have seen an animal so seemingly dead after electrical discharge that at first I adjudged it dead, and yet it has spontaneously recovered. If then I, who am somewhat conversant with the effects of these shocks on living organisms, might, by too hasty an examination, be deceived, how much more so those who by mere accident first approach the victims to the lightning discharge; and how shall all men be guided toward a more correct knowledge as to the positive signs of death? I answer on this point with much less of knowledge than I could wish, but I may perhaps so answer as to prevent one of the most serious of errors. The positive signs of death after lightning stroke, as far as I know them up to this time, are—

(1.) **ABSENCE OF ALL INDICATION OF MOTION OF THE HEART.**—This sign must be accepted with the understanding that there may be action of the heart which does not declare itself by audible sound or sensible motion detectable through the walls of the chest.

(2.) **ABSENCE OF REFLEX ACTION.**—As a rule, an animal which has been stunned simply by the electrical shock shows signs of reflex motion, so-called, when an irritant is applied to the eye or when the skin is pricked over a muscle. Whenever there is an exhibition of reflex action, the evidence is almost certain that living action is not absolutely suspended. But it must also be accepted with this understanding, that in batrachians, at all events, its absence does not of necessity denote death. We give a shock to a frog, for instance, and we see, on applying an irritant, that the animal shows no reflex action. Yet the probabilities are that the animal will be restored to life.

(3.) **DECREASE OF ANIMAL TEMPERATURE, IN THE CAVITIES, TO THE TEMPERATURE OF WATER LEFT EXPOSED TO THE SURROUNDING AIR.**—This, in our present state of knowledge, is a fair proof of actual death in warm-blooded animals. It does not prove the impossibility of recovery.

(4.) **ABSENCE OF COLOR IN SEMI-TRANSPARENT STRUCTURES.**—The passing of a strong light through the hand, or other semi-transparent structure, and observing if the red color which is seen in the living parts is absent, is a good sign of death; but is not, I think, absolutely reliable, inasmuch as there may be so much resistance to conveyance of blood through the vessels that coloration due to the presence of blood in them may be absent in the hands, or even in the cheeks, while yet there may be motion of the heart.

(5.) **RIGIDITY OF MUSCLES.**—If muscular rigidity be general, and the muscles of the chest be rigid, the evidence of absolute death is sufficient. But a partial or local rigidity of muscle is not of sufficient evidence. Rigidity may occur in one limb, so we saw at the last demonstration, in the line in which the electrical current has coursed through the body, and may not designate total extinction of living action.

(6.) **COAGULATION OF THE BLOOD IN THE VEINS.**—This is at once a ready and good sign of death. In the human subject the largest vein that can be found immediately under the skin should be laid freely open, a fillet being first applied above the place for the opening. If, then, in the vein there be found a coagulum, the inference is fair that the process of coagulation is complete, and that restoration of life is impossible.

(7.) **DECOMPOSITION.**—Lastly, the occurrence of decomposition of the body is the final proof of actual death; and although when the blood in the venous system is distinctly coagulated, and there is general *rigor mortis*, it may not be

necessary to wait for decomposition of the body before committing it to the earth, in the absence of the two changes just named—coagulation and rigidity—evidence of decomposition ought always to precede the act of burial.

A Remarkable Surgical Operation.

One of our old subscribers, who is a medical practitioner at Chicago, took part in the following case, which is described by the *Chicago Tribune*. The subject was a lady from Lee Center, Ill. A careful examination by Dr. Beebe, revealed the fact that the intestine involved in an old rupture had mortified, and to allow this to remain would inevitably destroy the woman's life. He, therefore, decided to remove so much of the intestine as had undergone decomposition, and by securing the extremities of the sound intestine, to restore at length the natural passages, and thus preserve the unfortunate lady's life. Assisted by Drs. L. Dodge, J. S. Mitchell, and A. G. Beebe, this dangerous and difficult operation was accordingly performed, and four feet six inches of the intestine were removed from the patient's body, and may now be seen preserved in alcohol, in Dr. Beebe's office. The operation completed, the abdomen was carefully stitched up, the patient enjoined to preserve perfect quiet, and to abstain from solid food. Thirteen days have now elapsed, and, astounding as it may seem, the good lady has well-nigh recovered, being now allowed the freedom of her room and a generous diet, which is heartily relished. What will not the surgeons do next?

Utilizing Garbage.

The *New York Sun* says that a company has been formed in Chicago, and will soon be in operation, for distilling alcohol and extracting soap grease from ordinary city garbage. The process is a patented one, and consists in taking the garbage just as it is hauled off in the city carts, dumping it into tight tanks, and boiling six hours at a temperature of 212°. This dissolves the whole mass, which is run into fermenting tubs and worked with yeast. The soap grease and impurities rise to the top of the tubs, and are skimmed off, and the residuum is distilled in the regular way. It is estimated that each barrel of garbage will yield three pounds of soap grease and four gallons of proof spirits. The soap grease is, of course, as good as any other, but the alcohol betrays its origin by an odor which requires further processes for its removal. For many uses, however, it is as good as that derived from grain or molasses, and, if its distillation is not too costly, will yield a considerable profit.

Composition of the Milk of Different Animals.

1,000 parts contain:

	Water.	Butter.	Cheesy Matter.	Sugar.	Mineral Matter.
Woman.....	889.08	26.66	39.30	43.68	1.30
Cow.....	864.20	31.30	48.80	47.70	6.00
Goat.....	844.90	59.87	35.14	36.91	6.18
Sheep.....	832.32	51.51	69.28	39.43	7.16
Ass.....	804.30	21.75	32.35	32.73	5.28
Mare.....	810.12	18.53	33.65	50.46	5.24
Sow.....	818.00	60.00	53.00	60.70	8.30

Proportions of solids and water in different kinds of milk:

	Woman.	Cow.	Goat.	Sheep.	Mare.	Ass.	Sow.
Water.....	889.08	864.20	844.90	832.32	804.30	810.12	800.00
Solids.....	110.92	135.80	155.10	167.68	95.70	109.88	182.00
	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00

Pig's milk is extremely rich, containing, as it does, nearly 50 per cent more nutritive matter than is found in that of the cow. It is not unlikely that in certain forms of disease where a milk diet is prescribed the use of so concentrated a liquid food might prove serviceable.—*Chemical News*.

Dry Docks at Brooklyn.

Two very large dry docks are now in operation at South Brooklyn. No. 1 is 500 feet long, 60 feet wide at bottom, and capable of receiving vessels of 12 feet draft at low water, or 18 feet at high water. No. 2 is 447 feet long, and receives vessels drawing 17 feet at low water, and 22 feet at high water. By means of a central gate this dock may be divided into two separate parts each forming an independent dock.

The pumping is done by means of a superior horizontal engine of 100-horse power and two oscillators of fifty and thirty horse-power, respectively. The former of these engines connects with a double centrifugal pump, of mammoth proportions, and with a capacity for pumping and discharging forty thousand gallons of water per minute. At this rate, the average time required for completely relieving the docks from water is about 3½ hours; the docks ordinarily contain eight millions of gallons of water. The oscillators are attached to centrifugal pumps used for drainage, or keeping the docks free from water when occupied by vessels. Their average capacity is about one thousand gallons each per minute.

Diarrhea

Is a very common disease in summer-time. Cholera is nothing more than exaggerated diarrhea. When a man has died of diarrhea, he has died of cholera, in reality. It may be well for travelers to know, that the first, the most important, and the most indispensable item in the arrest and cure of looseness of the bowels, is absolute quietude on a bed; nature herself always prompts this by disinclining us to locomotion. The next thing is, to eat nothing but common rice, parched like coffee, and then boiled, and taken with a little salt and butter. Drink little or no liquid of any kind. Bits of ice may be eaten and swallowed at will. Every step taken in diarrhea, every spoonful of liquid, only aggravates the disease. If locomotion is compulsory, the misfortune of the necessity may be lessened by having a stout piece of woollen flannel bound tightly round the abdomen, so as to be doubled in front, and kept well in its place. In the practice of many years, we have never failed to notice a gratifying result to follow these observances.—*Hall's Journal of Health*.

How to Set a Slide Valve having Equalized Exhaust.

1. Place the crank at the 180° location, mark on the cross-head and one of its guides opposing "center punch" points.

2. Bring the crank to the zero and mark a second point on the guide. The two points thus found, measure the length of the stroke. Move the eccentric until the valve has the required lead for the forward stroke.

3. Advance the crank in the direction of the motion until the exhaust of the opposite stroke closes; scribe a line across the guide which shall pass through the point on the cross-head.

4. Move the crank until the other exhaust closes and scribe a second line on the guide.

5. If now the exhaust should close at equal distances from the commencement of each stroke the motion would be in adjustment; if not, alter the length of the eccentric rod until the closure becomes equalized, then return the crank to the zero position, and alter the angular advance of the eccentric until the required lead of the forward stroke is secured.

The position of the valve at the moment of closure may readily be fixed by means of a "valve gage" fitting center punch points on the valve stem and its stuffing box.

The above process will serve also to equalize the cut-off if the valve be proportioned for this object.—*Auchincloss' Link and Valve Motions*.

How to Observe the Eclipse and Save Your Eyes.

A correspondent writes to the *Evening Post* as follows:

"Take a large card with a small round hole in the center, and hold it against the sun's rays, so that the shadow will fall on the floor, pavement, wall, or other dark and smooth surface. In the middle of the shadow there will be a true image of the sun, and the eclipse can be studied in its progress without straining the eyes, and without smutting face or hands with smoked glass.

"This simple process was suggested by the familiar circumstance, that the light spots in the shadows, during a solar eclipse, take the shape of the luminous portions of the sun's disk, and the perforated card has been used with perfect success."

A DURABLE CHAIR.—In response to an article published in these columns some time ago for a good chair we have received a number of specimens from different manufactures. One of the best and strongest is of the Shaker pattern, with arms, and splint bottom of generous width, made by Tarbel, Royse & Co., of Bellows Falls, Vt., under a patent granted to one of the firm, March 19, 1867. It is the embodiment of comfort, and looks as if it would endure for ages.

It is said that a cheap outer cell for a Daniells battery can be made from a common tin canister by placing it in a solution of sulphate of copper, and putting in the porous cell, zinc and acid as usual, and connecting the zinc with the canister below water mark by a copper wire. After a little the inside of the canister will be coated with copper. It is said to be quite as good as a cell made entirely of copper.

TREATMENT OF CORNS.—Persons troubled with corns, and who is not, will find great relief, and sometimes absolute cure, by the application of a slice of lemon to affected parts, secured by a strip of cloth, on going to bed. We have tried it on a painful hard old fellow and found immediate relief.

A MONSTER CANNON.—A new twenty-inch cannon, smooth bore, weighing fifty-seven tons, has lately arrived at Fortress Monroe from Pittsburgh, Pa. It is the largest piece of ordnance ever produced in this country. It will throw a ball weighing eleven hundred pounds.

Mechanical Engravings.

Such as embellish the *SCIENTIFIC AMERICAN*, are generally superior to those of any similar publication, either in this country or in Europe. They are prepared by our own artists, who have had long experience in this branch of art, and who work exclusively for us. There is one pertinent fact in connection with the preparation and publication of an illustration in our columns, that needs to be better understood by many inventors and manufacturers who pursue a short-sighted policy in bringing their improvements to public notice. They often go to a large expense in printing and circulating handbills, which few care either to read or preserve. Now, we undertake to say, that the cost of a first-class engraving, done by our own artists and printed in one issue of the *SCIENTIFIC AMERICAN*, will amount to less than one-half the sum that would have to be expended on a poorer illustration, printed in the same number of circulars, and on a sheet of paper in size equal to one page of our journal. A printed handbill has no permanent value. Thousands of volumes of the *SCIENTIFIC AMERICAN* are bound and preserved for future reference—beside, we estimate that every issue of our paper is read by no fewer than one hundred thousand persons. Parties who desire to have their inventions illustrated can address the undersigned, who are also prepared to send artists to make sketches of manufacturing establishments, with a view to their publication in the *SCIENTIFIC AMERICAN*. For particulars address
MUNN & CO.,
37 Yark Row, New York.

How to Get Patents Extended.

Patents granted in 1855 can be extended, for seven years, under the general law, but it is requisite that the petition for extension should be filed with the Commissioner of Patents, at least ninety days before the date on which the patent expires. Many patents are now allowed to expire which could be made profitable under an extended term. Applications for extensions can only be made by the patentee, or, in the event of his death, by his legal representative. Parties interested in patents about to expire, can obtain all necessary instructions how to proceed, free of charge, by writing to
MUNN & CO., 37 Park Row, New York.

Facts for the Ladies.

I have used a Wheeler & Wilson Sewing Machine in my shop for eight years, on an average of eight hours a day, making garments from the heaviest beaver to the finest cambric. I have taught at least twenty different persons to run it, and you know beginners do not improve a machine. It has never been out of repair, and is good for ten years more if used properly.
MRS. A. F. STRICKLAND,
Ware, Mass. Dress and Cloak Maker.