pulsion of dynamite is no doubt valuable, it is hardly to be expected that it will, with its limited range, ever take the place of heavy ordnance—a point which its inventors wisely do not claim; but if it shall transpire that the gun is, in itself, a practical success for much shorter distances, it will be of the greatest importance and a valuable accession to our present appliances of war.

Especially will this be so in this country, where our coast line is so extended, where good harbors are so numerous, and appropriations for harbor defense so meager and so often *nil*, and where in fancied security we expose our defenseless shores to hostile invasion; under these circumstances does it become necessary for us to substitute cunning for might, and rely upon some such means as torpedoes and dynamite guns to protect us from unexpected and uninvited approach.

Basket Willow.

E. H. McJ. asks what is basket willow, and where can it be obtained? A. It is a species of the genus *Salix* that is popularly known as swamp willow, or osier. For basket purposes the stump or stool is kept down by the cutting of the shoots annually, which are the portions used in basket making. It may be obtained in a wild state, being identical with the native pollard willow, or cuttings may be got from any reliable nurseryman.

About twenty-five years ago Col. Samuel Colt of revolving pistol fame reclaimed from the overflows of the Connecticut River, at Hartford, Conn., a vast area of land by means of extensive dikes which now form a portion of the street geography of the city. Within the area thus reclaimed he built his enormous factory and villages for his workmen. To protect the banks of the dikes from the action of the river currents and the destroying influences of rains and melting snows, he planted them thickly with osiers—the basket willow—and cut, or rather mowed, the shoots every summer with the intention of sending the vigor of the plants into the roots, so as to bind the inclined surface of the dikes in one mass. The result was just what was expected as to cohering the particles of the banks, but it forced the consideration of the utilization of the shoots annually cut away.

To do this, Col. Colt imported Swiss basket makers, built a collection of Swiss-fashioned cottages for them, and for several years (until his death) carried on the business of willow basket making. This industry has since ceased, but the osiers still grow in great luxuriance. The sides of the Colt dike in Hartford contain enough of osiers to plant hundreds of acres, as all that is necessary to insure growth is to insert a cutting in ground that is not absolutely dry.

The Maple Sugar Season.

It is so easy to adulterate maple sugar with cane sugar, or maple sirup with glucose, that those who really care for the genuine article find it rather difficult to get. This was notably the case last year, when the weather was not propitious for a good yield of maple sap. The best conditions for a good sugar season are found when the ground has been deeply frozen by a severe winter, followed by a spring which commences to open early, but gives several weeks of alternate freezing and thawing, before the frost is all out of the ground. Weather when it freezes quite sharply at night and thaws freely during the day, always gives a good "sap run." The following tables show the yields of maple sugar in the principal sugar producing States for the years 1870 and 1880, as given in the census reports of those years:

	1870.	1880.
	lb.	lb.
Vermont	8,864,302	11,261,077
New York	6,692,040	10,693,619
Ohio	3,469,128	2,895,782
New Hampshire	1,800,704	2,731,745
Michigan	1,781,855	3,423,149
Pennsylvania	1,545,917	2,866,010
Indiana	1,332,332	235,117
Total	25,486,278	34,106,499

But the above table only includes those States producing over 1,000,000 pounds. The addition of the product of those other States which produce less than this amount annually would considerably swell the above total for 1880, and probably bring it up nearly, if not quite, to that of 1860, which was about 40,000,000 pounds, and the largest ever recorded. This, at an average of 10 cents per pound, would give a value of $4,000,000.

JADE AND JADE OBJECTS FROM CENTRAL AMERICA.

In the American Museum of Natural History, on the gallery floor, there is displayed a group of curiously carved objects. Their colors are various shades of green, changing from a white faintly greenish in hue through a bright apple green to dark jasperoid olive. Their appearance is enigmatic, and their singular and bizarre forms and sculpture lend an agreeable contrast to the beautiful stone of which they are made. These objects, from their mysterious association with an extinct civilization, possess a value quite inestimable.

They are cut from jade, a stone which is of itself precious, delicate in tint, dense and tenacious in texture, and of extremely rare occurrence in nature. It takes a most lustrous polish, can be worked into fragile and exquisite forms, although it is so hard that a file makes but little impression upon it. This stone was formerly seldom found in the collector's cabinet, or at best represented by poor and unpretentious specimens, but the spread of Chinese exchange has brought elegant examples of their workmanship in this mineral to the hands of western connoisseurs.

Jade is pre-eminently a mineral of Asia, and its dissemination in prehistoric relics in Europe and America has formed the ground for elaborate disquisitions on early traffic and exchange between these remote regions, or used as evidence to establish a primitive migration from Asia as a center.

It must be remembered, however, that mineralogists now distinguish two kinds or species of stone, to both of which, in common language, the term jade is applied. One of these, *nephrite*, is essentially a silicate of magnesia with a specific gravity of about 3 and a hardness of 6 to 6·5, while the second is *jadeite*, a silicate of alumina with a gravity of about 3·33 and a hardness of 6·5 to 7.

JADE OBJECTS FROM CENTRAL AMERICA.

Prof. H. Fischer, of Germany, has devoted a great deal of attention to a close study of the probable origin of the jade objects of America and Europe, and reached the conclusion that one class, the nephritic, had been derived from the mines of Turkestan, and that the second class, the jadeites, had been brought from Burmah.

This rather strained conclusion has been combated by Dr. Meyer, of Dresden, who states that bowlders and fragments of nephrite have been found in North Germany and Steiermark, and raw jadeite in large masses, generally as bowlders, in Alaska.

In this opinion, recently published, he has been sustained by Prof. Arzruni, of Breslau, and so far as regards jade implements and objects in this country, it is interesting to learn that the Smithsonian Institution has received reports of the finding of jade in place, along with jade specimens, in Louisiana, while in 1881 Dr. Brantford, their agent, was commissioned to make careful examinations for possible jade mines in Central America.

Many other minerals seem to have been confused with jade, as ancient authors speak of specimens of a citron yellow, deep blue, turquoise blue, and red. Jasper, prase, emerald, and chalcedony have thus been confounded with true jade. In China the jade is called yu, a name of great antiquity, and is brought from the city of Khotan, in the canton of Yarkande, of Turkestan, being transported from Tartary through Bokhara. Here there are said to be mountains composed of this valuable stone, but the finest specimens are only found in the seams of the highest pinnacles, which are detached by the workmen, who clamber to these points and roll the separated masses down the mountain side.

Jade figures extensively in Chinese literature. It has been regarded with admiration from the earliest times. It is the synonym of purity and virtue. It forms the richest and most expensive decorations of the wealthy, and a thousand allusions in poetry and drama indicate its absorbing fascination for the Mongolian mind.

This stone was regarded by the inhabitants of Mexico and Central America with equal delight, and the evidences of their art are shown by our illustration. It was called by the Aztec the *chalchiuitl*, and the familiar story bears repeating of how Montezuma, in sending presents to the King of Spain, "desired to add a few *chalchiuitls* of such enormous value that he could not consent to give them to any one except such a powerful emperor. Each of these," he added, "is worth two loads of gold."

These interesting relics were discovered in 1852, in a vault in Ocosingo, in the department of Quesaltenango, Guatemala, and were purchased by the Museum from E. G. Squier, the famous explorer and archæologist. The most striking piece in the collection is shown in the center of the group. It is the Central American Buddha or Cuculcan, who was adored in Mexico under the name of Quetzalcoatl—the green feathered serpent. Of this quite delicately cut figure in pale jade, blotched with emerald stains, Mr. Squier says:

"The figure is represented seated cross-legged on a kind of ornamented couch or cushion, with the left hand resting on the left thigh, while the right hand is raised breast high, as if in the act of benediction. He wears a girdle around his loins, and on his breast is represented an oblong rectangular plate or tablet, suggestive of that said to have been worn by the Jewish high priests. The face is in profile, showing the salient nose and retreating forehead that characterize most Central American sculptures. An ornament is inserted in the lobe of the exposed ear, and the head is surmounted with the characteristic elaborate plumed head-dress that we observe on the monuments and in their paintings."

Two cup-like objects, with expanded rims, will be noticed in the illustration. These are rings which are supposed to have been attached to the heads of dignitaries or priests, and to have confined sheaves of feathers, such as so commonly constituted their luxurious head-dresses. Another characteristic head is shown upon the irregularly semicircular fragment near the middle of the group. Here is repeated the elaborate coiffure, in the midst of which appears a shield-like accessory; the enormous earrings are shown, and a collar or necklace projects beneath the chin. A close inspection of the carving reveals the tip of the tongue pushed up between the lips, which Mr. Squier considers a symbol of *life*, "for *to speak*, among the aborigines of America, was the synonym of *to be*." A similar though more profusely decorated head, with pendent earrings and massive necklace, is shown, and an instructive profile upon a triangular piece of jade near by presents the same features more clearly, while the high cheek bones, rather oblique eyes, and arched nose are typical.

Another striking relief has been cut upon a cylindrical portion of darker jade, and symbolizes death, with its closed eye and the depending tongue. This was taken from the ruins of Tuloom on the mainland of Yucatan. The other objects are less interesting, but all are carefully perforated, and some at a number of points, justifying the belief that they were suspended and used in personal decoration, or as ceremonial badges.

The skillful execution of these objects, the admirable portraiture, and the evidence they afford of the existence of a specialized class of artisans, as well as of a stock of ideas to illustrate, contribute to elevate our conceptions of a civilization which before the arrival of Columbus possessed its cities, temples, and an organized system of government.

Cure of Elephantiasis by Electricity.

An interesting communication on the treatment and cure of elephantiasis among Arabs by Doctors Moncorvo and Silva Aranjo has been presented to the French Academy of Sciences by M. Gosselin. The cure consists in decomposing the tumid swelling of the limbs, known as elephantiasis, by means of electrolysis, but at the same time the general health of the patient is also treated hydropathically, that is to say, by the cold water cure, sea baths, tincture of iodine, iodide of iron, arsenic, and other tonics. These medicines are intended to renovate the constitution, but are not of themselves sufficient to reduce the tumors. Electropathy, however, applied as soon as possible after the first manifestation, checks and ultimately cures it. The cure is generally perfect, and takes place at the end of a few days in some cases; but if the elephantiasis is of long standing the cure is also a long process, and must be accompanied by proper medicines. The electrolysis is effected both by continuous and interrupted currents sent through the tumid swelling.

Large Chimneys.

At a recent meeting in this city of the American Society of Civil Engineers, a paper by Hiram F. Mills, C.E., describing the construction of

THE PACIFIC MILLS CHIMNEY,

at Lawrence, Mass., was read by the secretary. This chimney was built by Mr. Mills in 1873, and consists of an outside octagonal shell, 222 feet high above the ground, with a distinct interior core 8 feet 6 inches in diameter inside, extending one foot above the top of the outer shell, and 11 feet below the ground. The chimney is founded 19 feet below the ground, upon coarse sand, the foundation being 35 feet square, inclosed by pine sheet piling. The base is concrete, 1 foot thick, then rubble masonry of large pieces of granite in cement, this stone work being 7 feet high. Upon the stone work is placed the brick chimney, the outer shaft being at the base 20 feet wide, and at the top under the projecting cornice 11 feet 6 inches wide. This brick work is 28 inches in thickness at the base; at 12 feet in height it becomes 24 inches, which continues 18 feet; then 20 inches for 20 feet, then 16 inches for 40 feet, then 12 inches for 60 feet, then 8 inches to the top. The inside core is 2 feet thick to a height of 27 feet, and 1 foot thick for the remaining height. The top of the chimney is of cast iron plates, ¾ inch thick. The horizontal flue entering the chimney is 7 feet 6 inches square. The vertical flue of the chimney is a cylinder 8 feet 6 inches in inside diameter, and 234 feet high, with walls 20 inches thick for 20 feet, 16 inches thick for 17 feet, 12 inches thick for 52 feet, and 8 inches thick for 145 feet. The foundations were laid in mortar of Rosendale cement and sand; the outer shell in mortar of Rosendale cement, lime, and sand; and the flue walls in mortar of lime and sand.

During the winter of 1873, the flue being 90 feet above the ground, boilers having 452 square feet of grate surface were connected with the chimney with satisfactory results. Between June and September, 1874, the chimney was finished. The approximate weight of the chimney is 2,250 long tons, the number of bricks being about 550,000. The chimney is opposite the middle of a line of 28 boilers, and 210 feet distant from them. It was designed to serve for boilers having 700 square feet of grate surface—burning about 13 pounds of anthracite coal per square foot of grate surface per hour.

The chimney was struck by lightning in June, 1880, after which date a lightning rod was put up, which consists of a seamless copper tube $\frac{5}{16}$ inch thick, 1 inch inside diameter, at the top of which are 7 points radiating from a ball 4 inches in diameter, the top of the central point being 8½ feet above the iron cap. The rod is attached to the chimney by brass castings, and is connected at the bottom to a 4 inch iron pipe extending 60 feet to a canal.

A description was then read of the

CHIMNEY OF THE MERRIMACK MANUFACTURING CO.

at Lowell, Mass., built under the direction of J. T. Baker, C.E., in 1882. This chimney is founded on a ledge of sandstone. The foundation, 30 feet in diameter, is built of granite blocks laid as they come from the quarry. At the surface of the ground there is a dressed granite base 2 feet 6 inches in height, laid in clear Portland cement, the remainder of the foundation being in Rosendale cement and sand; upon this base is placed the brick work, consisting of three cylinders, the outside one 28 feet in diameter, 24 inches thick, the middle one 18 feet in diameter, 8 inches thick, the core 12 feet inside diameter and 16 inches thick. The middle cylinder is carried up vertically 75 feet 6 inches; the outside ring has a batter 0·42 of an inch per foot to a height of 100 feet. At the height of 75½ feet the middle ring connects with the exterior ring, making the masonry at that point 36½ inches thick; it is then 20 inches thick for an additional height of 60 feet; 16 inches thick for 70 feet; and 12 inches thick thence to the enlargement for the chimney head. The core is uniformly 12 feet inside diameter to the top, the first 100 feet being 16 inches thick; then 12 inches thick for 60 feet; then 8 inches thick for 90 feet; and then 4 inches thick for 29½ feet to the top.

It is entirely separate from the outside masonry except about the doorways and openings for the flues. The core was laid in mortar of lime and sand; the outside shell in lime, cement, and sand. On one side of the chimney is a ladder of iron extending from the ground to the top, and on the opposite side is a ¾ inch galvanized iron wire rope, both ladder and rope being connected with a copper ring having four spurs, the central point of which extends 8 feet above the top of the chimney. The bottom of both ladder and rope is connected with a 16 inch water pipe. Two wrought iron flues enter the chimney, one 5 feet by 6 feet, the other 5 feet by 11 feet. The chimney is constructed to provide for 15 sets of boilers, only 12 now being in use. Each set has 103¼ square feet of grate surface, and is rated at 300 horse power. The weight of the chimney is 3,392 tons; 1,101,000 bricks were used, 6,875 cubic feet of stone masonry. The cap weighs 18,600 pounds; the cost of the chimney was $18,500.

CHIMNEY OF THE N. Y. STEAM HEATING CO.

A description was then given by Dr. Charles E. Emery, M.Am.Soc C.E., of the construction of the chimney, built under his direction, of the Greenwich Street boiler house of the New York Steam Heating Company. This chimney was a creature of circumstances, it being necessary to place within a very limited area a very large boiler capacity, viz., 16,000 horse power. This was done by making four stories of boilers; the chimney was therefore necessarily located with reference to these boilers, and the plan of the chimney was determined by the shape of the lot. The beach of the Hudson River was at some time at this locality, and the foundation of the chimney was placed in fine clear beach sand, with some pockets of coarser sand, and a little stone. The foundation is one foot below high water. The chimney is 27 feet 10 inches in the clear inside, and 8 feet 4 inches wide. The height is 220 feet above high water, 221 feet above the foundation; 217 feet above the basement floor; 201 feet above the grates of the lower tier of boilers; and 141 feet above the grates of the upper tier of boilers. The thickness of the walls on the interior of the building runs from five feet to 20 inches, and on the other sides from three feet to 20 inches. The gases for each chimney are taken from 32 boilers of 250 horse power each. About 1,000 tons of coal will be burned daily. It is expected that elevator arrangements will be perfected to receive this amount of coal each night. More trouble is experienced with the ashes than with the coal. Ordinary grate bars have been used. Cleaning is done once every six hours. We have used a new bar that turns on hinges and gives good results. We have not made many experiments with coal dust. We have to use a fuel which has some reserve power, to provide for possible contingencies. We find coal is worth about what is charged for it.

A MEXICAN CHIMNEY.

Mr. F. L. Griswold, M.Am.Soc.C.E., described a chimney erected in Mexico for a cotton factory, about 160 feet high, which had been in use for over twelve years, which was built of apparently sun-dried bricks, and which seemed to be now in excellent condition. This chimney was built by Indians, and seemed to be very symmetrical and well made. The bricks were about 10 x 3 x 7.

OTHER CHIMNEYS.

Mr. H. W. Brinckerhoff, M.Am.Soc.C.E., described a chimney constructed of old rails, which was in successful use in Pennsylvania. It was generally known as a crinoline chimney.

Mr. Wm. E. Worthen, M.Am.Soc.C.E., referred to several chimneys built by him, and expressed a doubt as to the necessity of very great height in chimneys.

Mr. J. M. Knap, M.Am.Soc.C.E., described chimneys constructed in Pittsburg, and which, though of very moderate height, had given excellent results.

Healthy vs. Injurious Brain Work.

There is such a thing as mind strengthening work. In truth, it is, as every physiologist knows, only by work minds or, more correctly speaking, brains can be strengthened in their growth and naturally developed. The exercise of those centers of the nervous system with whose function what we call consciousness and intellect are associated, is as essential to their nutrition as activity is to the healthy growth of any other part of the organism, whether nervous or muscular. Every part of the living body is developed, and enjoys vitality, by the law which makes the appropriation of food dependent upon, and commensurate with, the amount of work it does. It feeds in proportion as it works, as truly as it works in proportion as it feeds. This canon of organic life is the foundation of those estimates which physiologists form when they compute the value of food in measures of weight lifting power. It is, however, necessary to recognize that, although these propositions are true in the abstract, they need the introduction of a new integer or combining power before any sum of results can be worked out.

We know that food is practically just as truly outside the body after it has been eaten, digested, and even taken into the blood current, as it is when it lies on the table. Nutrition is a tissue function, and its performance depends on the appetite and feeding power—which is something different from the organic *need*—of the tissue with which the nutrient fluid is brought into contact. Again, any particular part of the organism may be so exhausted by work that it has not power enough left to feed. It is a matter of the highest practical moment that this fact should be recognized. There is undoubtedly a point at which work ceases to be strengthening and becomes exhausting—self-exhausting and self-destructing so far as the particular issue in activity is concerned.

Work may be carried too far, in fact to such a point that not only the last reserve of power for action, but the ultimate unit, so to say, of the force of nutrition, which is, as we now believe, identical with the force of general activity, may be expended in work and the organism left so utterly powerless that its exhausted tissues can no longer appropriate the food supplied or placed within their normal reach. We have said that it is necessary this should be understood. It has a special bearing on the question of brain work in childhood and adolescence.

Just as extreme weakness and faintness of the body as a whole produce restlessness and loss of control, so extreme exhaustion of the brain produces mental agitation and loss of healthy self-consciousness. This is how and why the "overworked" become deranged. One of the earliest indications, or *symptoms*, of brain exhaustion is commonly irritability; then comes sleeplessness of the sort which seems to consist in inability to cease thinking either of a particular subject or things in general; next, the mental unrestful or uncontrollable thought gets the better of the will, even during the ordinary hours of wakefulness and activity, which is a step further toward the verge of sanity than the mere persistence of thought at the hour of sleep—this way lies madness; and, finally, the thinking faculty, or, as we say, the imagination, gets the better of the will, and asserts supremacy for its phantoms, those of sight or of hearing being the most turbulent and dominant which happen to be most commonly used in intellectual work, and therefore most developed by the individual cerebrum—this *is* madness. Such is the story of overwork of the brain or mind; and it is easy to see that at any stage of the progress from bad to worse the will may be overpowered, and the judgment perverted, in such manner as to impel the victim of this mind trouble to seek refuge in death, or to so disorder his consciousness that he supposes himself to be acting in obedience to some just and worthy behest when he commits an act of self-destruction or does something in the doing of which he accidentally dies. Such, in the main, is the story of suicide from overwork.

What, then, can be the excuse pleadable by those who heap on the brains of the young or adolescent such burdens of mind labor and worry as exhaust their very faculties of self-help and leave them a prey to the vagaries of a starved brain? We pity the suffering of those shipwrecked sailors who after exposure in an open boat, perhaps without food, for hours or days, "go mad" and, raving of feasts and pleasures the antitheses of their actual experience, fall on each other, or throw themselves overboad. Have we no pity for *brains* dying of lack of food because we have compelled them to expend their very last unit of force in work, and now they are distraught in the act of dying?

It may be a sublime ideal, that of a highly educated people; but if it should happen that the realization of this beautiful dream of our philosophic reformers can only be achieved by the slaughter of the weak, it will scarcely console the national conscience to reflect that, after all, "the survival of the fittest" is the law of Nature.—*Lancet.*

Food and Treatment in Fevers.

Modern usage differs materially from the practice some years ago in the treatment of fevers. Dr. George L. Peabody, of the New York Hospital, recently read a paper on the treatment of typhoid fever, before the New York County Medical Association, advocating the full cold water bath, and approving solid food at the beginning of convalescence. Dr. Austin Flint, Jr., in discussing the paper, said: "No physician of the day believes that the production of heat in fevers comes from the oxidation of the blood in its passage through the lungs. It is considered as one of the results of a class of phenomena which occur in the tissues themselves. Physiology has advanced in the direction of positivism, and is rapidly being reduced to mathematical exactness. Experiments have been made to determine the heat value of certain elements of food. I found by observation of a man who walked 317½ miles in five days, and also by experiments upon myself, that more heat units were produced than were supplied by the food. I have also come to the conclusion that water is formed in the body by the union of oxygen and hydrogen. The production of something requires material; heat cannot be produced without the consumption of something. In typhoid fever, in the absence of nourishment, the fever must feed on the tissues. The question is, What will supply this material? It has occurred to me that fatty, farinaceous, and saccharine food, glucose and alcohol will save the tissues. In the experience of physicians, alcohol reduces heat in fevers. Theoretically, one ounce of French brandy is equal to 398 heat units; thirty-four ounces would supply all the heat produced in his body in twenty-four hours, by a man weighing 140 pounds. It seems to me that if you can supply the fever with food for the time it runs—and it must run—you will have the patient in a better condition as to tissue."

Prof. Austin Flint, Sr., said: "I differ as to the value of sponging as a means of reducing temperature. Where it is properly performed it is efficient. I also use and recommend enveloping the body in a wet sheet, which should be sprinkled from time to time until the temperature is reduced. I concur with Dr. Peabody as to the absence of danger in giving solid foods, when the patient desires it. There is no specific at the present time for typhoid fever. In my early practice, no alcohol was given, and the patient was placed on a starvation diet. Then came a time when alcohol was used freely; this was followed by a more moderate use of it."

Running for Trains.

The *Medical and Surgical Reporter* cautions those persons who are in the habit of "running for trains" against the practice.

Even to one whose heart is sound, running, when not accustomed to such hurried movement, is certainly not beneficial to the delicate cords and valves of the heart; and should this organ be diseased, it must prove very injurious.

We all know that violent and tumultuous action is to be avoided when the heart is weak, and we also know that running is not the way to avoid it.

In our own experience, says the writer, we know several instances where men who had previously supposed themselves to be *sound* have run for trains, and getting aboard have fallen exhausted into seats from which they never arose.

Better miss a train than run the risk of running into the jaws of death; for this strain on the heart cannot prove beneficial to one that is sound, while it is likely to prove disastrous to one that is weak.