

Improved Center-board.

The subject of this invention is a new method of hanging center boards used on small vessels. By an improved method of hanging them the vessel is controlled with much more ease and certainty on rough water and may be run in shallower water than with the old style of board.

The inventor provides a yoke, A, which slides in a groove in the casing, B, straddles the center-board and is confined by a bolt, C. The usual tackle is fastened to the upper end of this yoke and another line to the rear of the board. It is easy to see, therefore, that by lowering either one or the other of these lines, or both at the same time, a greater or less amount of the center-board surface will be below the vessel, and that it is capable of being placed on line with the heel when desirable. These fixtures can be applied to boards now in use, and any change may be made in the shape of the upper end of the yoke so as to use different kinds of tackle, according to the weight and size of the board.

A patent was obtained on this invention through the Scientific American Patent Agency on Feb. 20, 1866, by J. F. Hall, of Westerly, R. I., whom address for further information.

Periodic Phenomena.

Considerable interest attaches to what may be termed the "periodic phenomena" of nature. Of such a character are the appearance and disappearance of animals, as bats and badgers, which conceal themselves during the winter, and pass through a period of hibernation; the change of dress at different seasons by the ermine, the stoat, and their allies; the coming and going of the regular winter or summer migratory birds; the retirement and hibernation of reptiles; the movements of certain fish up and down stream for the purpose of spawning; the appearance, transformations, and disappearance of insects; the leafing of trees; the flowering of plants; the ripening of seeds; the fall of leaves—all these, and more, are worthy of the attention of the lover of nature, and not beneath the dignity of man. Linnæus constructed for himself a floral clock, in which the periods of time were indicated by the opening or closing of certain flowers. Gilbert White, and others since his time, not disdaining to be his disciples in such a work, constructed a calendar, of which periodic phenomena presented themselves to their notice. Humboldt observes of the insects of the tropics, that they everywhere follow a certain standard in the periods at which they alternately arrive and disappear. At fixed and invariable hours, in the same season, and the same latitude, the air is peopled with new inhabitants; and in a zone where the barometer becomes a clock (by the extreme regularity of the horary variations of the atmospheric pressure) where everything proceeds with such admirable regularity, we might guess blindfold the hour of the day or night by the hum of the insects, and by their stings, the pain of which differs according to the nature of the poison that each insect deposits in the wound. And the Rev. Leonard Jenyns, the naturalist, remarks:—"If an observant naturalist, who had been long shut in darkness and solitude, without any measure of time, were suddenly brought blindfolded into the open fields and woods, he might gather with considerable accuracy from the various notes and noises which struck his ears, what the exact period of the year might be.

All such observation as we have alluded to are easily made and as easily recorded, and of all, none are of more interest than the migratory movements of birds. We know that some visit us in the spring and abide during the summer; others direct their flight hither late in the autumn, and spend with us their winter. But why this change, whence do they come, and whither do they go? We can partly answer this question, but only partially. We may declare, in general terms,

that self-preservation and the perpetuation of the species, is the great moving cause. That the journey is undertaken in search of food, or a milder climate, or both, as a consequence the former of the latter, or in search of suitable conditions for rearing their young; yet there are many special circumstances in which this answer is inapplicable or insufficient."

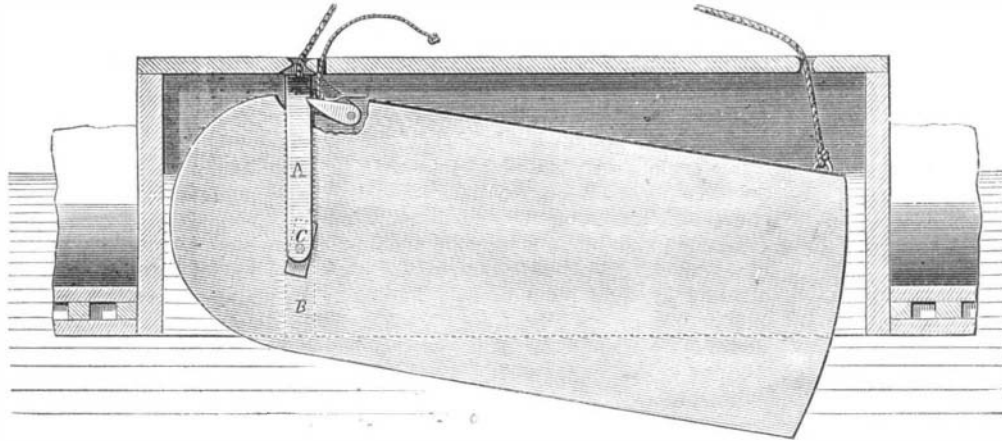
Knapp, in his "Journal of a Naturalist," remarks of the willow wren:—"It is a difficult matter satisfactorily to comprehend the object of these birds in

delays the workman, and we are sure that many can bear witness to one trial carpenters and joiners have to bear; that is, when withdrawing a bit from a hole just bored, to have it part company with the brace and fall out. This does not matter much where there is but one hole to be made but when there are many the evil is a serious one.

The reader will see in this engraving a remedy for it. The shank of the brace is provided with a screw thread, A, and nut, B. This nut, when screwed up, forces a jaw, C, up to the protruding end of the bit, and also against the body of it below, so that it is firmly held in place beyond the possibility of accidental detachment.

Besides the sense of security thus given, the bit bores better and straighter. Sometimes the shanks of the bits do not fit the squared socket in the brace, and they wobble about. With this fastening any bit can be securely held.

Patented through the Scientific American Patent Agency on Jan. 16, 1866, by J. P. Gordon, whom address at West Garland, Me., for further

**HALL'S CENTER-BOARD.**

quitting another region, and passing into our island. These little creatures, whose food is solely insects, could assuredly find a sufficient supply of such diet during the summer months in the woods and thickets of those mild regions where they passed the season of winter, and every bank and unfrequented wild would furnish a secure asylum for them and their offspring during the period of incubation. The passage to our shores is a long and dangerous one, and some imperative motive for it must exist; and, until facts manifest the reason, we may, perhaps, without injury to the cause of research, conjecture for what object these perilous transits are made."

The record of periodic phenomena made in the same district over a series of years is always of interest; but contemporaneous records made at numerous stations distant from each other, and in which the same kind of observations are made, would be of more interest still. Take, for instance, the first appearance of a swift for ten successive years in twenty stations between the Isle of Wight and Caithness; or the last note of the cuckoo heard between the Land's End and the Tweed. Many such trifles, apparently insignificant in themselves, become of importance when carefully and faithfully recorded, and such a work may be accomplished by those who make no pretensions to be men of science, but are content to call themselves "lovers of nature."

—Scientific Gossip.

GORDON'S BIT FASTENING.

Every trade has some special annoyance or vexa-



tion appertaining to it which tries the temper and

information.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.**INFLUENCE OF INVENTIONS ON CIVILIZATION.**

Dr. R. P. Stevens read a long paper on the "Influence of Inventions on Civilization." The paper was mostly made up of statements of facts showing the wonderful effect of different inventions in increasing the rewards of labor and improving the condition of mankind. The most impressive of these statements was one made to illustrate the effect of railroads. "When Queen Elizabeth moved her court, 24,000 horses were called into requisition, and the consumption of provisions was sufficient to support 190,000 men. The royal progress was more dreaded than the march of an invading army, and the region through which it passed was reduced to famine from which it required years to recover. When Queen Victoria visits Scotland, she is carried in a special train at an expense of about \$5,000."

EXPERIMENT TO ILLUSTRATE THE ACTION OF WATER IN BOILERS.

Mr. Norman Wiard presented an apparatus to illustrate the sudden rise and fall of water in steam boilers. He had a cylindrical glass beaker, about four inches in diameter and twelve inches in height, divided by ten tin diaphragms half an inch apart. The lower diaphragm had an inch hole through the center, and the one next above four half inch holes near the periphery, and all the diaphragms were punched in the same alternate manner, about one-seventh of the area being removed. The object of these diaphragms was to obstruct the escape of bubbles of steam which were formed at the bottom of the beaker. The vessel was filled with water to a level with the diaphragm next to the upper one, and the water was made to boil by a spirit lamp under the beaker. So soon as ebullition commenced, the surface of the water rose about an inch and a half; the action being manifestly due to an increase of volume by so large a portion of the space being occupied by bubbles of steam. On injecting a very little cold water, which was led by a pipe to the bottom of the beaker, the boiling was stopped, bubbles of steam ceased to be formed, and the surface of the water instantly fell to its first level.

The experiment was designed to illustrate the cause of the sudden fall of water in boilers on the cessation of ebullition—a phenomenon that has been frequently observed by engineers, especially in boilers having narrow water spaces, where the free rise of bubbles of steam to the surface is obstructed. The boiling may be stopped either by opening the furnace doors, or by starting the feed pump, or by closing the safety valve.

STREET RAILROADS.

The regular subject of the evening was "Means of transit between different parts of New York City," but the discussion consisted principally of expressions of individual opinion in regard to the various schemes which have been elaborately described in our columns. The weight of opinion seemed to be in favor of a road built in an open, dry canal, just deep enough to run the cars below bridges laid at the surface, and passing through the middle of the block west of Fourth Avenue and Broadway. It was suggested that there might also be a similar road on the east of Broadway.

PROFESSOR JOY ON CROWDED CARS.

Professor Charles Joy, of Columbia College, remarked that the engineering problems involved were not in the line of his studies or of his knowledge, but the social or humanitarian side of the question, which had been broached, was of interest to every citizen. He wondered that the people of New York city did not rise in their majesty and put an end to the abuses of our horse-railroad system. He had traveled during the last year 6,000 miles in Europe—just 6,000. Five hundred of this was by other means than steam, 5,500 by steam. He had rode in first, second, third, and fourth class cars, he had traveled under ground and above ground, on water and land, and he had never experienced discomfort which approached that to which he had been subjected that evening in coming down from Forty-ninth street to the Cooper Institute. He had come directly from his laboratory, but he never had in his laboratory odors so vile—his science was not able to produce so foul a compound of stenches as filled the car in which he rode. If the railroad companies treat us thus above ground, what will they do when they get us into subterranean tunnels? He thought that the principal care of the citizens should be to see that, in the granting of franchises, ample provision is made for the protection of the community from imposition.

THE CURRENCY DELUSION.

Money continues to get closer as our government contracts the currency. By drawing off the currency the common people are oppressed, and the interest of the money lender is enhanced. In creating the interest-bearing United States bonds was legislation enough in favor of the capitalists for one generation.

If forty-five years' experience in mercantile, manufacturing and farming business has taught me anything, it is that men prosper best when money is most plenty; and always run down, become poor, or break down when money is scarce. In this I find but one exception, and that is the money lender. We need \$1,100,000,000 of currency to do the business of the country this year, and as fast as the United States interest-bearing bonds fall due pay them also off in legal tenders, together with the premium on gold, if need be; and induce the capital now hoarded in bonds, by a suitable permanent protective tariff, to go into manufactures, and to developing the vast resources of our country. H. H. M.

Galesburg, Ill., March 20, 1866.

[It is a curious fact that while no one pretends to understand geometry, or chemistry, or geology, without a methodical mastery of the several problems in their natural order, most people suppose that they are masters of political economy without any study of it whatever]

To give a complete answer to our correspondent it would be necessary to write a treatise on the science of political economy. In the limited space at our command we must content ourselves with reminding him that capital is not the same thing as money. The capital at interest in the country is twenty or thirty times greater than the amount of all the money in the country. Capital consists of horses, sheep, swine, corn, wheat, sugar, plows, steam engines, cloth, and all those forms of wealth which are employed in the production of more wealth. If we had \$1,100,000,000 of currency in the country—if it was in the form of gold, we should send all but 200,000,000 of it abroad, and exchange it for iron, copper, tin, cordage, and other kinds of capital that would be more useful to us than an excess of currency; if it was in the form of paper notes, it would be worth not more than 20 cents in the dollar, and would go no further in accommodating any man with the kind of capital that he needs in his business than \$200,000,000 of currency would. The use of currency is to effect the exchange of commodities, and the same dollar is used over a great many times; \$100 of money may be employed in loaning \$1,000, or \$10,-

000 worth of capital. The rate of interest depends upon the supply of the aggregate capital in all its varied forms, in relation to the demand—not to the desire, but to the commercial demand—by those who not only desire more capital, but who are also able to give satisfactory security for its repayment. In the year 1850 the people of California had more money in proportion to the population than any other community ever had, but the aggregate capital was so small in proportion to the demand, that the regular rate of interest on perfect security was ten per cent a month.

The money of this country is not more than two or three per cent of our aggregate wealth, but it is a very important part, for it is the general measure of values, and therefore, an element in all pecuniary transactions. Every man in the community is interested in having this measure always of the same capacity. The fluctuations inseparable from an inflated paper currency are disastrous in a thousand ways—they impair the obligations of contracts, they rob the workman of his wages, they check the growth of our towns and cities, they infuse uncertainty and distrust into all business relations, and they materially diminish the production of wealth. The tendency of an inflation of the currency is to increase the difficulty of hiring money, and to raise the rate of interest on all ordinary securities.

The most disastrous measure that Congress ever adopted was the inflation of the currency, and every month's continuance of that inflation is costing the people of this country untold millions of dollars.

Application of Electricity to Paddle Engines.

General the Count de Molin, an Italian nobleman, has constructed and patented a paddle engine, working by electricity, to be adapted to a small boat, christened *L'Electricite*, destined to ply on the large lake of the Bois de Boulogne. The working parts are thus composed:—There are two upright hoops, about two feet and six inches in diameter, placed three inches apart, in the periphery of each of which are encased sixteen electro-magnets, placed opposite each other. Between these there is another hoop or wheel, of soft iron, of the same diameter as the others, and so articulated as to receive, when alternately attracted by the magnets at each side in succession, a sort of rolling from side to side, or "waddling" motion. To this wheel is fixed an axis about seven feet long, which constitutes the prime moving shaft of the machine. When the wheel between the magnets takes its rolling motion it causes the ends of this axis to describe circles; one end turns the crank of a fly wheel, while the other end is adapted to a framework, on the same principle as the pentagraph, which enlarges the motion received from the central disk, and communicates it in the form of a stroke by a connecting rod to a crank on the paddle shaft. This end of the moving bar also sets to work the distributors for alternately establishing and cutting off the electric communication between the magnets and the battery. There will be in all sixteen elements of Bunsen's. The force of the machine while at work with four elements was found to be one quarter man power, so that with sixteen cells the power will be about that of a man. The paddle wheels are two feet and six inches in diameter.

The Iron Clad Monadnock.

The Navy Department has received intelligence of the arrival of the double-turreted iron-clad steamer *Monadnock* at Montevideo on the 17th of January, after a passage of five and a half days from Rio de Janeiro.

The average knots an hour run by the *Monadnock* was 7.37; the greatest distance run in 24 hours was 184.2; the least distance, 173.6.

The following is a detailed statement of the time under way, coal consumed, &c.:

	Days.	Hours.
Total time under way.....	5	18
Total amount of coal consumed.....	168	17
Average per day.....	29	7
Total revolutions of engines.....	519,367	522,093
Average per minute.....	627	63
Greatest number per minute.....	66	66

Saw manufacturers will find it profitable to advertise in the *SCIENTIFIC AMERICAN* constantly. Our readers are frequently writing to us for the above articles.

MISCELLANEOUS SUMMARY.

CURIOUS COUNTER-CURRENT IN LAKE ERIE.—The *Cleveland Herald*, of a recent date, notices a phenomenon in Lake Erie. Many persons gathered along the banks of the Cuyahoga river to see the water flowing toward the source whence it came, carrying with it logs, blocks, and other floating material. In the afternoon the river rose about two feet, being at its highest stage about four o'clock, when from some cause the water began to flow in an opposite direction from the lake. The wind was blowing a stiff breeze from the south, which makes the matter more singular.

THE consumption of coal, including waste, in the United Kingdom, amounts to three times the quantity expended in 1845. In the year 1845 the consumption in Great Britain, for domestic and all manufacturing purposes, was 31,800,000 tons, and there were exported in the same year, 1,800,000 tons. In 1865, however, there were consumed for domestic and all purposes of manufacture 87,000,000 tons, 9,000,000 tons being exported.

THE greatest pressure of wind ever registered at Glasgow Observatory, was 55 lb. per foot. Professor Airy, however, states that it may reach 80 lb. per foot in this country, while Mr. Scott Russell asserts that 40 lb. per foot is about the maximum force which it is necessary to reckon upon in constructing roofs, etc. This is identical with the maximum registered at Menai Bridge.—*Engineer.*

RECENT accounts from Leghorn state that there is a rise in the price of petroleum, of which the consumption is said to be so large in Italy that the supply is not equal to the demand. The price has so much increased lately that companies have been formed at Turin and Genoa for working and purifying the produce of the petroleum springs which exist in Parma and Calabria.

MAKERS of clothes-wringing machines will do well to advertise in the *SCIENTIFIC AMERICAN*. We have constant inquiries from all parts of the country. A short advertisement constantly published in our paper would doubtless prove profitable to the manufacturer and convenient to readers.

It appears from a number of experiments that the bronze of which the ancients formed their weapons and other articles, was composed of 88 parts of copper to 12 parts of tin. It is remarkable that the same mixture has been employed by nations very remote from each other.

IN the year 1541 the deviation of the magnetic needle from the meridian at Paris, was found to be from seven to eight degrees to the east; in 1,550 from eight to nine degrees, and in 1,580 eleven degrees and a half to the east.

AN American student, Francis A. Channing, of Boston, has lately taken the Arnold prize at Oxford, Eng., for an English essay. The prize amounts to two hundred and ten dollars, and is open to all Oxford graduates of less than eight years' standing.

THE French ordnance committee have come to the conclusion, first, that breech-loaders are a mistake for large calibers; and that for rifled guns, throwing heavy shot, the Whitworth gun is the best. The only thing against it is its cost.

PUGET succeeded in adjusting the eye of a flea so that by the use of the microscope he was enabled to see objects through it. It multiplied and diminished every object. Thus a soldier appeared like an army of pigmies.

PATENT EXCHANGE.—We are requested to state that in consequence of the destruction by fire of building No. 229 Broadway, Mr. Orwig's patent sale exchange has been located at No. 111 Fulton street.

IT HAS been estimated that a tun and a-half of water falling one foot per minute, will grind and dress a bushel of wheat per hour.

IF hydrogen gas be breathed for a few moments it has the curious effect of changing the voice. The effect very soon disappears.

13,392 tons of water are every day converted into steam and discharged into the air from locomotive engines alone in Great Britain.

AS MANY as 12,500 facets have been counted in the eye of a dragon-fly.