

Correspondence.

A Machine Wanted.

To the Editor of the SCIENTIFIC AMERICAN :

As you are doubtless aware, there is a large export of ginger from Jamaica, amounting in 1896 to over £50,000, and the trade is capable of considerable expansion. The cleaning and preparing of the ginger for the market, as now performed by hand, is a slow, primitive, tedious and wasteful process. After the roots are dug they are washed and the outer skin removed by means of a small, sharp knife resembling the blade of a pen-knife. As you will see by the specimen of green ginger (sent by sample post), the roots are very irregularly shaped and the present system involves the loss of a large percentage of the root which is broken off or cut away in removing the skin. The market value of ginger is much enhanced by its having undergone the process of peeling, and better prices are obtained for the larger specimens. An expert can peel by hand about 1 cwt. of un-cured ginger in the course of a working day, for which he is paid 60 cents. My object in writing is to invite the attention of your readers who may consider the matter of sufficient importance to warrant the adaptation or invention of some machine for peeling the ginger more economically, expeditiously and effectively than at present. If such a machine were brought forward, I feel sure it would be well received, not only here but in other ginger-producing countries.

GEORGE A. DOUET.

Jamaica Agricultural Society,
Kingston, Jamaica, W. I.

Discovery of Aboriginal Remains near Springfield, Mass.

BY HARRY ANDREW WRIGHT.

An interesting discovery of Indian remains has just been made at Springfield, Mass., by the exploration of the cemetery connected with an aboriginal village and fort. Two or three years ago the village site was thoroughly explored according to scientific methods, it probably being the first work of the kind ever attempted in the Connecticut Valley.

In these explorations the entire field is first blocked out with stakes and strings to facilitate drawing plans of the excavations. A trench is then dug along the first block, and keeping a vertical wall in advance, the block is sliced down, inch by inch. As each block is completed, ground plans are made indicating the location of every article found. In no case are excavations made from the surface. The moment this is done all is confusion and the sequence of materials is lost. The method is expensive in proportion, but only such methods give full results. Unless this work is done thoroughly it is of no value whatever, as isolated objects without record of source or association are of no scientific importance, however interesting they may be as curiosities.

The palisaded fort of the Agawanis stood on Long Hill, on a jutting bluff which gives a view for miles and miles in either direction along the valley. The ground is of a peculiar formation, being cut through with deep gullies, between which narrow headlands lie, and on one of these headlands was the village and fort. According to tradition, this fort was occupied by the Indians of Agawan as late as October 5, 1675. On the evening of that date, having burned the little town of Springfield, they left the valley, never to return.

As the ground had received much natural deposit in the two hundred years since its occupancy, the first work was to remove about a foot of soil from the surface, exposing the original surface to view. Here the ground was found to be laid out in regular blocks about eight feet square. Within each square a camp fire had been built at some remote period, the gray wood ashes being packed into pits some eight feet in circumference and two or three feet deep. So hard were the ashes in some of these pits that it was impossible to dig into them, and often the entire contents had to be removed before being broken up. Within these hard masses were found the remains of many a feast. Bears' jaws with every tooth perfect, deer antlers and human ribs were found in perfect condition, the Indians believing that unless the bones from the meat were preserved and burned, all the game would leave the country. The supposition is that the location of each one of these ash pits marks the site of a wigwam, inside of which a fire was built, the smoke passing out through the roof. The site of ten rows of lodges and two large council houses was uncovered.

The existence of so large a village would lead one to suspect the near presence of a spring of water, and, after much searching, the village water supply was located. It seems that years ago a bank caved in, covering the mouth of the spring, which caused the water to flow under ground and form a marsh at the foot of the hill. By digging away the bank the opening was uncovered and the water again gushed out as it did in the old Indian days. From the spring a patch, screened by a close hedge, followed the brook to the fish weirs and canal landing by the river side.

Near one of these houses or wigwam sites the first

skeleton was found. It was the custom to bury the dead near the house, after preparing the warm body by tying it in a contracted position, with the knees drawn up to the chin, and the neck, thighs and legs flexed. When cold and stiff it was put into the temporary grave in the village. Once a year all of these bodies were exhumed and with great religious ceremony given a final resting place in the permanent burying ground.

The explorers expected to find the permanent cemetery on the next bluff south of the fort, and much fruitless searching was made at the time the village was explored. But not until last month was it found, and on the second bluff south. Here, about eighteen inches below the surface, the whole ground was covered with charcoal from the old watch fires, which were kept burning to warm the departed spirit on its journey to the happy hunting grounds. As the bluff was cut away, thirteen skeletons were found embedded in the dry sand, like raisins in the slicing away of a cake. Each was headed to the south, the region where their god was supposed to dwell, facing expectantly to the east, from which direction the Indian messiah was to appear. The bodies were lying on the right shoulder; the right hand was under the cheek; the left lay across the breast, and the knees of each were drawn up under the chin. As the workmen cut away the ground from south to north, the bones grew older and more frail, until finally it was only possible to detect in the clear sand the discoloration produced by the mould of the crumbled skeleton. The charcoal, quite firm at first, grew gradually more soft, until it was only possible to see a line of black beneath the surface mould.

Of the thirteen perfect skulls, three were of abnormal growth, having an extra bone, the epactal in the back. This is somewhat common in animals, but rare in human beings, and is therefore of much interest to evolutionists, as showing the low order of the race. Several are those of very aged persons, for there are but four or five teeth, and the jaw bones are worn perfectly smooth where the others once were. Nearly all show the great development of the lower, back part of the skull where the animal instincts are delineated.

Contrary to expectation, no relics were found in the graves. A few flint chips and a rough stone ax were lying near the surface, and in the charcoal were a clay cup and two metal spoons. These, with a few Dutch "fairy pipes," brought by early traders from New York, were the only articles found in the cemetery.

Casting Copper Pure.

The current issue of the Electrical Review contains the announcement of a discovery in the art of casting copper. Copper is ordinarily cast by the use of alloys. It is stated that the new metal, which is known as M. B. copper, is cast pure. Foundrymen have heretofore considered this an impossibility.

It is also stated that the new metal possesses an additional tensile strength of 33½ per cent, and that a much higher percentage of elasticity has been developed, and that the new metal has a conductivity of 95 per cent as compared with the best rolled copper. This will cause distinct changes in the building of dynamos, motors, railway and telegraphic apparatus, because the new copper is believed to carry the same amount of current with one-third the amount of metal. Wire made of it will have a greater strength and conductivity than the ordinary copper wire.

Mr. Edison says he accounts for the evident change in the atomic structure of the metal by the theory that the shape of the crystals has been altered, so that their lines are parallel, and that the molecules are thus brought closer together and into more intimate contact with each other. It is understood that Mr. Edison is interested in the development of this metal, and that it will be manufactured under his supervision at his Menlo Park works.

Electro Capillary Light.

In a contribution to Wiedemann's Annalen, No. 12, abstracted in the London Electrician, Herr O. Schutt, of Jena, describes a new electric discharge phenomenon, which he terms electro capillary light. When the discharge of an induction coil is sent through a narrow capillary tube of about 0.05 mm. in diameter, provided with aluminum or copper electrodes and filled with air under ordinary pressures, an intense luminosity of the tread of air is obtained—a luminosity which is intrinsically far superior to that of the arc, and would form an exceedingly powerful source of light if it could be made continuous. The narrow capillaries deteriorated rapidly, roughening inside, and were blown into a series of spherical enlargements. Wider tubes gave less light, but were much more permanent. At the same time the bright lines in the continuous spectrum in the original light became more prominent. At pressures above one atmosphere the phenomena were nearly the same, but the sparks passed with greater difficulty. At low pressures the light became less intense, the continuous spectrum faded, and the bright lines shone out more distinctly. The kind of glass is immaterial. It is stated that the tubes may be made 20 centimeters long and make splendid line sources.

ABOUT MERRIMAC SHIP BUILDING.

BY HORACE C. HOVEY.

The origin and decline of the art of ship building should interest others besides seafaring men. I use the word "art" advisedly. A veteran ship carpenter put the case thus to me one day. If a man paints on canvas, he is an artist; if he makes verses, he is a poet; if he contrives machinery, he is an inventor; if he builds meeting houses, he is an architect; but if he builds ships, he is only a mechanic. Yet the master ship builder must be artist, poet, inventor and architect combined. He must know the trees of the forest, in order to select timber for keels, ribs, knees, masts and other parts of his ships. He must choose materials that can endure soaking in salt water, rubbing against wharves, and the concussion of billows; reject what will not bear Arctic cold or tropical heat; and use what will not be split or shaken when pierced by bolts or wrenched by storms. He must be as familiar with natural laws and experimental results as most inventors; must have as good taste concerning form and color as an artist, and exercise his imagination as much as an average poet, in order to shape the graceful outlines, bounding curves, and due proportions of his vessel from truck to keelson, so as to compel the admiration of lovers of the beautiful, without sacrificing strength or utility. I have not used his exact words, but these were his ideas.

The first ship of the English navy was built by command of Henry VII, at a cost of £14,000, and was named the Great Harry. An official inventory made at the death of Henry VIII shows that the gross measurement of the English fleets, in A. D. 1547, was but 12,455 tons, and that the average size of the vessels in the navy was less than 240 tons each.

The first vessel built in New England was the Virginia, of only thirty tons burden, launched by the colonists at the mouth of the Kennebec River, in Maine, A. D. 1607, thirteen years before the arrival of the Mayflower at Plymouth, Mass. Ten years before the coming of the Mayflower, Lord Delaware saw in the roads at Point Comfort, Va., four vessels, the Virginia, the Discovery, the Deliverance, and the Patience. Small as was the Virginia, it was staunch enough to make several successful voyages across the Atlantic, and merits more fame than it has received.

Six shipwrights were sent over to New England, in 1629, by the Massachusetts Bay Company, the chief of whom was Robert Moulton. Their first vessel, mainly built of locust, owned by Governor Winthrop, and named by him The Blessing of the Bay, was launched July 4, 1631, at Medford, on the Mystic River. Ship building was begun at Salem, in 1635, by Richard Hollingsworth, with aid and encouragement from the Rev. Hugh Peters; at Gloucester, in 1643, by William Stevens; at Ipswich, in 1668, probably by Daniel Hovey, whose wharf was built that year, and which may still be seen at low tide; and at what is now Newburyport, in 1680, by the recorded vote of the old town of Newbury, granting land for that purpose to Benjamin Rolfe and others, at a point near what was then known as "Watts, His Cellar." Possibly Duncan Stewart built vessels before this at Thorlay's Bridge, on the Parker River. Ship building was also carried on along the Merrimac at Bradford, Haverhill, Amesbury, Salisbury and other localities. From Massachusetts Archives, Vol. VII (unprinted), "there were 130 vessels built on the Merrimac River from the year 1681 to 1714, of which over 100 were built at Newbury." The first in this list is the Samuel and David, of 100 tons. A number of them were built for London owners. A rude old painting may be seen in the public library of Newburyport, of a ship on the stocks at Moggridge's yard with Indians and negro slaves at work.

Among famous shipwrights of Newburyport may be mentioned Ralph Cross, and his sons, who built many vessels, including the frigates Hancock, Boston and Protector. Ralph Cross, Jr., was made a brigadier general during the revolutionary war. In 1775, Col. Benedict Arnold embarked a regiment of 1,100 men on ten vessels, and sailed from the Merrimac on an expedition against Quebec. In August of that same year the first privateer fitted out within the limits of the thirteen colonies sailed from Newburyport. It was owned by Mr. Nathaniel Tracy of that place, whose ships, as it appears from a memorial to Congress, "captured 120 vessels that were sold for 3,950,000 specie dollars, and with these prizes were taken 2,225 prisoners of war." The history of our privateering has never been fully written up, but this shows what was done by a single patriotic merchant and shipowner. How much more was done we have no means of definitely knowing. But the melancholy side of the record is that, besides those that went forth and returned again, 22 vessels, with crews numbering 1,000 men, sailed and never returned. For many years after the war every vessel leaving American ports was required to be fully equipped with guns, even though sailing on a peaceful errand. Hence, in mentioning the launching of ships designed for the East India trade, etc., it was customary always to state how many guns were carried. Newburyport vessels

often carried costly cargoes and had to be protected. The first blow given to American commerce was the act of Congress (1805) forbidding armed vessels to leave the United States without a special permit, under penalty of forfeiture. The "Embargo Act" of 1807 was the next heavy blow, but prosperity returned on its repeal in 1809. The Wasp, launched from Merrill's shipyard, in 1814, captured thirteen English merchant vessels in seven months, when she was sunk by a British frigate. The first ship that sailed from the United States after peace was declared between the United States and Great Britain, in 1815, was the Indus, of Newburyport.

It is interesting to note the steps of progress from the tiny Virginia, of 30 tons, built in 1607, up to the mighty warships and merchantmen, of from 500 to 1,500 tons and upward. The steamers Ontario and Erie, built by George W. Jackman, Jr., were of about 3,000 tons burden each. But the largest merchant ship ever launched on these waters was the Daniel I. Tenney, registering 1,687 tons, built by the late John Currier, Jr. Among other large ships built here were the Dreadnaught, 1,414 tons, the Farragut, 1,549 tons, the Radiant, 1,608 tons, the Racer, 1,669 tons, besides sixty others of over 1,000 tons each.

For many of the foregoing facts we are indebted to Mr. John J. Currier, the son of the veteran shipbuilder mentioned above, who gave an address on the subject some years ago, and has also just published a substantial volume of 729 pages, entitled "Old Newbury, Historical and Biographical," a work full of valuable information as to the ancient ferries, bridges, wharves, docks and shipyards, as well as other features of the history of this seagirt town. The book is embellished by numerous cuts, one, the portrait, being kindly loaned to us. It introduces us to the famous old shipbuilder himself. John Currier, Jr., who laid out this shipyard in 1833 and occupied it for fifty years, was the seventh in a direct line of descent from Richard Currier, one of the founders of Salisbury, Mass. He was born April 14, 1802, and died September 2, 1887; a man of integrity and honored with various offices municipal and ecclesiastical. During his long life he built and launched ninety-eight ships, brigs and other large vessels, which is probably more than was ever done in that line by any other American. In April, 1883, he launched the Mary L. Cushing, owned by Mr. John N. Cushing, which was the last merchant ship built in Massachusetts. Mr. J. J. Currier has made a curiously interesting and authentic list of all the ships, barks, brigs, brigantines, schooners and other seagoing vessels built in the district of Newburyport, from the organization of the United States government down to 1877, with the class, name, tonnage and ownership of each vessel, and stating when and by whom it was built. By my actual count I find thus catalogued 2,115 vessels, not including many more that were built here on contract and then sent, as was frequently done, to other ports to be documented; nor does it include the hundreds of fishing boats, yachts and other boats built here and of which no record has been made.

The decline in what may properly be called American commerce; the rapid disappearance of the forests of oak, pine and other kinds suitable for ship timber; together with the gradual substitution of steamers for sailing vessels, are the main causes that have practically destroyed what was once one of our proudest industries. Occasionally barges, sloops and smaller vessels are built along the Merrimac; but the era of ship building is ended, so far at least as these waters are



JOHN J. CURRIER JR.

concerned. The business was extinct twenty years ago in Salem, Gloucester, Ipswich, Rowley, Salisbury and Haverhill; and although kept alive for a few years longer in Newburyport, it is now decayed, and it will

henceforth be known only in history. But it certainly should thus be known. The nation that justly honors its statesmen, warriors, literary men, architects and inventors ought to keep a place amid its archives for men like the Woodwells, Moggridges, Carrs, Crosses, Curriers, Gerrishes, Jackmans, Merrills, Hacketts, Mansons, and others, who, during a period spanning more than two centuries, manned the busiest shipyards on the continent, gave employment to many hundreds of skilled artisans, launched more than 2,000 seagoing vessels, with an aggregate tonnage of fully 400,000 tons. We are indebted to Mr. Otis P. Gould, of Newburyport, for the accompanying illustrations of the old shipyard and launch, made from his photographs. Most of those forty shipyards of the Merrimac and vicinity have been absorbed by other and more prosaic industries. A few only remain, unoccupied and in ruins.

A Brick Country Road.

The first brick country road laid in the United States has been put down in Monmouth Township, Warren County, Ill., says the Boston Transcript. The road is the culmination of a series of experiments in road building, and though it is regarded as more or less on probation, the utmost confidence in its success is expressed. When hard road building began in the township, four years ago, it was decided to expend the money on hand in an experimental way. Monmouth Township had long been a sufferer from bad roads. In winter the town had often been completely blockaded by mud too deep for wagons. Even within the town itself the streets were so poor that at times the "bus" lines were obliged to suspend business, and mail and baggage were carried to the railway station on wheelbarrows. The manner in which the roadway was laid is described as follows: The ground was prepared for it by grading and being allowed to stand for two months. It was treated to an occasional scraping, so that it would pack evenly, and when the contractors were ready to lay brick it was as hard and even as a floor. The first thing was setting the curbing. This was made by 2 inch x 6 inch oak plank, set 7 feet apart, and held by oak stakes 18 inches long, and put down every 4 feet. Inside this was put a 5 foot bed of sand. This was evened up, and the single course of No. 1 paving brick was put down. They were set on edge, and make a fine roadbed. Outside of the curb 2 feet of crushed rock was laid, graded up to make an easy approach. This makes a road 11 feet wide. The earth on each side was graded and worked, making it all 40 feet wide, and affording tracks on each side for use in dry weather. The average cost of the stone roads has been 70 cents per foot. The brick road cost \$2,600 for 3,000 feet, or about 90 cents a running foot.



AN OLD NEWBURYPORT SHIPYARD.



A LAUNCH IN A NEWBURYPORT SHIPYARD.

Great St. Bernard Avalanche.

The left wing of the great monastery of St. Bernard has been demolished by an avalanche, says a dispatch from Berne, dated March 1, 1897. Fortunately no lives were lost, nor was anyone seriously injured, but the monks occupying the monastery were in serious danger for some time before their safety was assured.

When the great masses of snow and ice descended upon the building, the occupants took refuge in the part of the building which remained intact, and from there were able to dig a tunnel under the snow, through which they crawled. Most of them were severely frostbitten.

Motor fire engines are to be tried in Paris, and horseless carriages are now admitted to the Bois du Boulogne.