the embankments, and foundations for protectir walls. The total cost of the entire work thus far, cluding everything, has been $1,624,798. The value of the land reclaimed, in its present condition, is estimated at not less than about $3,000,000, so that viewed as a commercial enterprise, it has been a profitable undertaking for the government.

One of the views shows the condition of the flats at low tide, as given by a photograph taken from the top of the unfinished Washington monument in October, 1883, when the monument had reached a height of 384 feet. Another view represents the improvement as it appears to-day, and was taken from the top of the present Washington monument. The diagram, drawn to a scale, gives the relative size and positions of different parts of the work, all of which has been done under the direction of Col. Peter C. Hains, U. S. A., in charge of various public works in the immediate vicinity of Washington, and to whom we are indebted for the details given.

From the Capitol to the Virginia Channel is now one large park, marred only by the unsightly tracks of the Baltimore and Potomac Railroad. Embraced in this area are the Botanical Gardens, Medical Museum, Smithsonian, Agricultural Department, Bureau of Engraving and Printing, and the Washington monument. This park is a favorite drive for the thousands of visitors to the capital, and the grounds of the White House border it on the northwest.

Something Queer in the Numbers.

Mr. John W. Kirk, the white-haired veteran who was with Morse when the first working telegraph line was stretched, and who stood beside the great inventor when the first message was transmitted from Annapolis Junction to Washington, has made, during his life, a great many interesting calculations in numbers. The two most remarkable numbers in the world are 3 and 7.

"The numeral 7," says Mr. Kirk, "the Arabians got from India, and all following have taken it from the Arabians. It is conspicuous in Biblical lore, being mentioned over 300 times in the Scriptures, either alone or compounded with other words. It seems a favorite numeral with the divine mind, outside as well as inside the Bible, as nature demonstrates in many ways, and all the other numbers bow to it. There is also another divine favorite, the number 3—the Trinity. This is brought out by a combination of figures that is somewhat remarkable. It is the six figures 142,857.

"Multiply this by 2, the answer is 285,714.

"Multiply this by 3, the answer is 428,571.

"Multiply this by 4, the answer is 571,428.

"Multiply this by 5, the answer is 714,285.

"Multiply this by 6, the answer is 857,142.

"Each answer contains the same figures as the original sum and no others, and that three of the figures of the sum remain together in each answer, thus showing that figures preserve the Trinity.

"Thus 285 appears in the first and second numbers, 571 in the second and third, 428 in the third and fourth, and 142 in the fourth and fifth.

"It is also interesting to note that, taking out of any two of these sums the group of three common to both, the other three, read in the usual order from left to right, will also be in the same order in both sums.

"Take the first and second sums, for example. The group 285 is common to both. Having read 285 out of the second sum, read right along and bring in the first figure of the thousands last. It will read 714. All the others will read in the same way.

"Again, note that the two groups of three in the first sum are the same as the two groups of threes in the fourth, reversed in order, and that the same thing is true of the second and third. The last multiplication has its groups of threes the same as those of the original number, reversed again.

"Examine these results again, and you will see that in these calculations all the numerals have appeared save the 9. Now multiply the original sum by the mighty 7—the divine favorite of the Bible and of creation—and behold the answer! The last of the numerals, and that one only in groups of three—again the **Trinity!**

$$\begin{array}{r} 142{,}857 \\ 7 \\ \hline 999{,}999 \end{array}$$

"No other combination of numbers will produce the same results. Does not this show the imperial multipotent numeral 7 and its divinity?"—*N. Y. Sun.*

A DOUBLY tin-lined and hermetically sealed box containing rubber coats has been in the Atlantic Bonded Warehouse, San Francisco, Cal., for some time. Recently it was found to be quite hot, and day after day the heat became more intense until it was decided to investigate. Finally a permit was got from the collector to open the box. It was taken from the building and opened with an ax. As soon as the fresh air struck the contents, flames leaped into the air for several feet and a cloud of smoke escaped. The rubber goods were mackintoshes containing **some compound which caused spontaneous combustion.**

Correspondence.

Concerning Steam Vessels.

To the Editor of the Scientific American:

A few weeks past I saw in your paper of the 18th of April, in our Howrah Institute, that you had made inquiries into the reason why your American cruisers fell short of keeping up the speed which they made on the four hours' trial. There can only be one answer; That the boiler power was not in the vessel. The engines can be made all sizes, but the boiler power must not be a sham, or failure is the result.

In the same paper you state a vessel is being constructed of the cruiser class, 7,400 tons displacement, and to have three screws, and the speed for four hours to be 22 knots and the indicated horse power 23,000. For a vessel of this displacement to steam 22 knots the engines would require to indicate 26,000 horse power, and the vessel would require to be of the following dimensions: Length, 450 ft.; breadth, 56 ft.; depth of hold, 36 ft.; mean draught, 22 ft. 6 in.; coefficient of fineness block, 0·45; midship section, 0·7854; angle of entrance, 10°.

Boilers twenty-two in number; diameter, 13 ft. × 18 ft.; four furnaces to each (double-ended boilers), having combustion chambers 4 ft. × 4 ft. common to both furnaces. Boilers to work under forced draught. Tubes 7 ft. long by 3½ in. diameter. Total heating surface, one boiler, 3,500 sq. ft. Furnaces 3 ft. 6 in. diameter by 7 ft. long. Total grate surface, one boiler, 84 sq. ft. Total steam space in one boiler, 600 cu. ft. Working pressure, 180 lb.

Engines—three sets of triple expansion; sizes according to the number of revolutions to get up the indicated horse power, say for engine having 5 ft. stroke and to indicate 8,500 at 100 revolutions.

			Inches.	
100	rev. per minute, working pressure 180 lb., cylinders	40	60	100
120	" " " " "	36	56	95
130	" " " " "	35	55	92
140	" " " " "	34	53	88
150	" " " " "	34	50	86
160	" " " " "	33	48	83

Each set of these engines will indicate 8,500 H. P. on a consumption of 1·5 lb. of coal. Calculations made from a 110 in. cylinder, cutting off steam at $\frac{1}{20}$ of stroke. Revolutions 130, working pressure 180 lb. steam.

Consumption of coal per H. P., 1·5 lb. per hour.

Diameter of screw shaft, 22 inches.

Diameter of propeller 16 ft., pitch 20 ft., for 160 revolutions.

Diameter of propeller 18 ft., pitch 28 ft., for 100 revolutions.

Angle of blade at tip 26°, at boss 4 ft. 6 in. diameter, angle 63° for propeller 18 ft. diameter, pitch 28, wing engines. Propeller for center engine 20 ft. diameter, pitch 30 ft., angle at tip 25° 30', 5 ft. boss, angle at 62°.

The first set of cylinders, viz., 40 in., 60 in., 100 in., with propeller 18 ft. diameter, 28 ft. pitch, 100 revolutions, should be fitted in the wings of vessel; and engines having cylinders 45 in., 70 in., 106 in., with 6 ft. stroke, 100 revolutions, propeller 20 ft., pitch 30 ft., angle at tip 25° 30', diameter of shaft 24 in., should be fitted to center of vessel.

The cost of a vessel of this class in England would, if built by Laird Brothers, Birkenhead, be about $2,750,000. W. WOODS, *Engineer Apprentice,*

Ahmuty & Co., Howrah Foundry, Calcutta.

Calcutta, August, 1891.

Underground Wires in China.

"A superstitious reverence for the dead accomplished years ago in China something that regard for the comfort and safety of the living, even when aided by judicial mandates and radical municipal methods, has been only partially able to accomplish in this country," said a telegraph lineman who was in the employ of the company that established the first telegraph line in China.

"The telegraph wires are placed underground there, and if the company had not so disposed of them there would have been no telegraph lines in China to this day. Dead ancestors are held in peculiar reverence in that curious country, and the casting of a shadow upon the grave of an ancestor is looked upon by the Chinese as an insult not to be borne, and it is always resented with impetuous rage. Now there are no cemeteries or general burying grounds in China, but every family's ancestors, particularly in the rural districts, are buried on the family premises. Consequently, every yard or garden is a receptacle of ancestral remains, and as China is thickly populated, the revered bones of the dead and gone Mongolian progenitors may be found resting beneath every few rods of earth. When the telegraph company went to work to put up the poles on which to hang its wires, the workmen were embarrassed every little while by wrathful Chinamen, who would rush angrily upon certain poles and chop them to the ground, and warn the workmen with much furious chatter that they would put them up again at their peril. The cause of this interference was unknown to the workmen, who were at last forced to discontinue the work, and explanation was demanded by the authorities. Then it was learned that the poles that were cut down had cast a shadow some time during the day on the graves of revered ancestors of Chinamen, and the insult could be wiped out in no other way but by summarily removing the poles. It was found that this superstition was too sacred a one among the Chinese to be overcome by persuasion or bribery, and at last the telegraph company, as a matter of economy and self-protection, laid their wires beneath the surface, where they have been ever since."

Forests.

"Did it ever occur to you to consider what an enormously valuable inheritance man has received in the 'forests primeval'? said Professor Fernow, of the Department of Agriculture, in conversation with a Washington *Star* writer. "Of all the natural resources received by nature for our benefit, they are the most directly useful. In the woods we find ready at hand and obtainable for mere harvesting materials applicable to all the needs and means to satisfy every immediate want.

"Probably you will be surprised when I tell you that the annual increase of the forests by natural growth, representing the interest which we are at liberty to draw without impairing the principal, exceeds in the United States alone ten times the value of the gold and silver output of this country, and is worth more than three times the product of all our mineral and coal mines put together. If to the value of our total mining product be added the value of all the stone quarries and petroleum resources, and this sum be increased by the estimated value of all the steamboats, sailing vessels, and canal boats plying in American waters, it will still be less than the value of the annual forest product of the nation by a sum sufficient to purchase at cost of construction all the canals, buy at par all stocks of the telegraph companies, pay their bonded debts, and equip all the telephone lines. The annual product of the woods is worth three times as much as the wheat crop. It exceeds the gross income of all the railway and transportation companies, and it would more than wipe out the entire public debt.

"More than 300,000 people are occupied to-day in the direct manufacture of forest and sawmill products alone. Were I to attempt an enumeration of the uses to which the product of the woods is put, it would be necessary for me to mention all the phases and employments of human life. Railways annually consume 500,000,000 feet of timber. The same material builds the houses and yields for two-thirds of the population the fuel necessary to warm their dwellings with and to prepare their food. Upon charcoal the iron industry largely depends. Not only in its natural form does the substance serve our needs, but our ingenuity has devised methods for transforming it into all sorts of useful things. Paper is made from it, and even silk, while it has become possible to prepare from brushwood a feed for cattle as nutritious as hay. By distillation are derived from it alcohol and acetic acid, while the barks yield indispensable tanning material, resin and tar for pitching vessels, turpentine, sassafras, oil, and cork.

"The decayed vegetation of forests has furnished to the fields their present fertility, upon which man depends for food. In the tree growth of virgin woods and in the floor of rotted foliage beneath are stored the accumulations of centuries. Nature does not care whether this growth is useful to the human race or not. It is left for us to encourage the growth of such trees as we find valuable, to the exclusion of others. Thus an economical use is made of the resources at hand and a new conception of the forest arises. The forest primeval becomes 'woodlands, while the new 'forest' includes only cultivated woods.

"If left without interference by man, Nature would keep the entire earth covered with forests, save only a few localities. The treelessness of the great central plains of the United States has been accounted for by the deficiency of rainfall, and the belief is generally held that by reason of this lack of moisture trees can never grow there. Nevertheless the conclusion does not of necessity follow. There is excellent cause for believing that these prairies were not always treeless, and that their nakedness might once more be covered by the adoption of proper means to that end. The barrenness occasioned by prairie fires and herds of tramping buffalo may yet be made fruitful. You must remember that the entire earth is a potential forest. Wherever there is sufficient depth of any kind of soil for the roots, if it is not too frigid a climate and man does not interfere, arborescent growth will ultimately prevail on account of its perennial character and its power to shade out lower vegetation. In such localities as the interiors of large continents forest planting must progress by gradual advances from the borders of the unproductive territory. Once let woods be spread over the now arid plains of the West and there would be rain in plenty there. But success in this matter can only be achieved through co-operation systematically and methodically carried out, commanding knowledge, means, and power such as a government, **whether of the nation or of States, can alone control."**