upper end of Petty's Island across to the New Jersey side, completely closing the upper end of the eastern channel and compelling the entire current to pass down on the Philadelphia side. The action of the current, under these circumstances, would be to round off the lower end of Petty's Island and also to distribute the force of the ebb tide more uniformly over the river. This, in connection with the removal of the islands, would undoubtedly remove both the obstructions and their cause, and give Philadelphia once more a harbor.

"There is another matter of much importance also connected with the improvement of the river, viz., the extension of the port warden's line out into the river, narrowing the channel and giving increased length of piers.

"Even if the harbor permitted the arrival of ocean steamers," says *Mechanics* in a recent article, "there are no piers of sufficient length to receive them. Vessels are constantly increasing in length and the piers should be lengthened in proportion, and, if the obstructions are removed, as indicated above, the extension of the line on both sides of the river would produce a channel of sufficient width and reasonable uniform depth. On the Philadelphia side this line should come out about 500 feet, and on the New Jersey side about 400 feet, thus providing ample room for docking vessels of the largest tonnage anywhere along the river front, from one extreme to the other."

A number of gentlemen representing the city councils, the various railroads, the Chamber of Commerce, Board of Trade, Maritime Exchange, harbor commissmissioners, port wardens, and elevator companies, made several visits to Washington and conferred with the House Committee on Rivers and Harbors. The above bodies were re-enforced by a committee from the Camden City Council. Congressman Randall at length had a bill passed which was considered satisfactory by the commercial and other bodies interested, and the government has appropriated large sums of money for the purchase and removal of the two lower islands and a considerable slice of Petty's Island. This done, the port warden's lines on both sides of the river will be extended, as suggested in a foregoing paragraph, thus giving docking facilities hitherto unknown, and admitting of a considerable widening of that crowded street on the Philadelphia side known as Delaware Avenue.

In addition to the money appropriated by the general government, considerable sums are about to be given by the States of Pennsylvania and New Jersey and the cities of Philadelphia and Camden. So in a very short while work will be commenced, and when completed, Philadelphia commerce will receive a boom that has been long held back solely on account of these existing obstructions.

Perpetual Motion Again.

Until a few days ago, the inventors of perpetual motion have been prevented from completing their application for letters patent in the United States by the skillful manipulation of one of the rules of the office. The Receiver-General has the power to demand a working model of any apparatus before it can be protected by a patent, and it may naturally be imagined that no such apparatus has ever made its appearance. But we have changed all that now, for the chief clerk of the Patent Office in Washington has declared publicly that perpetual motion was an "assured fact, and that at the present time there are now in the Patent Office machines which have sufficient power to run themselves from now till doomsday," and that "a machine with surplus power for the running of other machinery will come some day, and may come at any time." The American newspapers express their anxiety as to whether the practical management of the Patent Office depends to any great extent upon the chief clerk. —*Industries.*

Our excellent British contemporary is usually very correct, but has somehow fallen into several little errors in the above item. There is no such officer as the Receiver-General connected with the American Patent Office. The chief clerk of the Patent Office in Washington has not publicly declared that perpetual motion was an assured fact; he has not stated that at the present time there are in the Patent Office machines which have sufficient power to run themselves from now until doomsday. The American newspapers have not expressed any especial anxiety concerning the chief clerk. He is a gentleman of well known ability, highly esteemed and respected by everybody. The management of the Patent Office is in the hands of the Commissioner of Patents.

Thick Mortar in Brickwork.

G. D. Dempsey, in the *Architect,* London, says: One important rule has to be observed in order to produce good brickwork, viz., that the mortar should be as thick as it may be, or as nearly approaching the solid form as is consistent with the degree of plasticity essential for its proper distribution and penetration into the joints, while the bricks should be thoroughly wetted on the surface. By these means the adhesion between them is rendered the more perfect, and the subsequent amount of shrinking and settlement is reduced to a minimum.

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SCIENTIFIC AMERICAN SUPPLEMENT

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NAVAL AND MARITIME PROSPECTS UNDER THE NEW ADMINISTRATION.

On the 4th of March the official term of Grover Cleveland as President expired, and the new President, Benjamin Harrison, of Indiana, was inaugurated. He is fifty-six years of age, a man of marked ability and the highest probity. It is gratifying to know that the improvement of the navy, which was so vigorously prosecuted during President Cleveland's administration, is to be continued under the new *regime.* In his inaugural address, President Harrison says:

"The construction of a sufficient number of modern war ships and of their necessary armament should progress as rapidly as is consistent with care and perfection in plans and workmanship. The spirit, courage, and skill of our naval officers and seamen have many times in our history given to weak ships and inefficient guns a rating greatly beyond that of the naval list. That they will again do so upon occasion I do not doubt, but they ought not by premeditation or neglect to be left to the risks and exigences of an unequal combat.

"We should encourage the establishment of American steamship lines. The exchanges of commerce demand stated, reliable, and rapid means of communication, and, until these are provided, the development of our trade with the States lying south of us is impossible."

NAVAL WAR OF THE FUTURE.

In his second paper on "The Naval War of the Future," Admiral Porter, for purposes of illustration, imagines a war as existing between Great Britain and France, and a great expeditionary force on the French coast only waiting a successful issue of a combat between the Channel fleets of the two powers to set out for the invasion of England. Into this combat the Admiral brings what are thought to be the best ships of both sides, and other types of war engines which European authorities incline to look upon as most effective. If the behavior of these monsters is fairly drawn, those who believe we are poorly off without them will have been properly answered; it will appear that these and other powers have for years been wasting energy and money, and indeed some may even be so bold as to see in the picture which the Admiral himself gives us, good circumstantial evidence of how unreasonable is that regret, which he expresses more than once, that we have not been similarly occupied.

Instead of making for the Frenchman as of old, the British are portrayed as waiting for him to come up, a sort of pounding match ensuing in which those engaged are not more likely to hit the enemy than to run foul of their neighbors, so awkward are the ships in the Channel's rolling seas, so uncertain the aim of their ponderous guns. While the opposing monsters are struggling to keep their spirits up, several speedy little craft flying the English flag run athwart the advancing French line, and then disappear in the cloud of powder smoke that hangs upon the waters. The French do not know what to make of the maneuver till a number of their ships drift helplessly here and there, their screws tied fast in the mesh of iron wires left buoyed up by the mysterious little vessels. Then a mite of a torpedo boat jams a spar torpedo against the biggest of the enemy's ships and blows her up. She was prepared to pierce 20 inches of steel armor, but not for the mouse gnawing a match in her magazine. The only effective work is done by the torpedo boats and similar mischievous craft, the result of the contest being the withdrawal of both fleets.

Curiously enough, the Admiral, after a lengthy description of his supposititious sea fight—the impotency of the modern line-of-battle ship becoming more evident as he proceeds—when, indeed, he has fairly demonstrated that the smaller and more quickly handled gun is more effective than the really heavy gun, he suddenly turns about to declare: "We could, if we would, soon be equal to the best of European navies in line-of-battle ships and heavy guns." His subsequent allegation that "there is not one perfect line-of-battle ship in any navy" would seem to do as little to recommend the new type he presumably has in mind as that now in vogue, for of what value would his "perfect" line-of-battle ship be to us, if only to "make us equal" to that European ship which, if the picture he draws for us may be relied on, is manifestly impotent? He says:

"In the naval wars of the future, the United States will not, probably, play a conspicuous part. This country seems to possess none of that fitness for naval power of which her early history gave promise. The United States government waited twenty years after the close of the civil war before commencing to rehabilitate the navy, on the plea that 'it was desirable to see what the powers of Europe were going to do,' apparently not remembering that the best steam and sail vessels of the world were the results of American genius in the days when it took the initiative. Americans have abdicated the position which their vast resources entitle them to hold."

Then he goes on to describe the operations of the British fleet under Admiral Seymour against the defenses of Alexandria, and thus concludes: "Every

naval officer will admit that the old wooden line-of-battle ships of the Trafalgar and Wellington class would have silenced the forts in an hour with little damage to themselves. If the Egyptian shells had been charged with dynamite, all would have been changed."

Thus it would appear that the modern fleet has not fulfilled its promise, while the dynamite principle, as applied to projectiles--a principle, be it said, which so far has seen its highest development in America—is commended by the most distinguished authorities, among them the chief officer of our navy. That being the case, it would seem as though we could not have been idle to more advantage in the one direction or used our energies to better purpose in the other.

For further proof of this, we may turn to the Admiral's paper. He finds reason to believe that two or three small crafts armed with long range dynamite shell guns would be more than a match for the most powerful armorclad ship afloat. There's the Graydon gun, which the Admiral recommends so highly. How would one of these great ships fare if opposed to it? At a recent experiment with a 7 inch Ames wrought iron muzzle-loading rifle weighing 23,000 lb., powder 23 lb., a projectile weighing 122 lb. charged with 2⅔ lb. dynamite was fired at a 7 inch iron turret; the explosion of contact lifting the turret, weighing 30,900 lb., and carrying it 25 feet by actual measurement, the plates being torn violently apart.

The Zalinski gun is yet, in the opinion of the Admiral, of insufficient range, but he believes it will yet become another important factor in naval war.

From all this it is seen that, however unwise the policy of waiting may be when regarded as an abstract proposition, its adoption, at least in the present case, would seem to have been fortunate. At the breaking out of the civil war in 1861, the effective power of our fleet was small. In four years' time it was the most powerful in the world, even the British steam fleet, only a few years before acknowledged to be the best equipped on the ocean, being compelled to take second place because of the introduction of naval armor of Yankee designing.

PROPOSED INCREASE OF THE BRITISH NAVY.

The intentions of the English government with regard to the navy have recently been formulated by the First Lord of the Admiralty before Parliament. It is proposed to build eight first-class men-of-war, of 14,000 tons each, and two of 9,000 tons, besides nine first-class cruisers and twenty-nine smaller vessels. A total tonnage of 318,000 is represented, and a cost of about one hundred millions of dollars is predicated. Four and a half years are allowed for carrying out the programme. The work, it is proposed, shall be divided between the government ship yards and private firms. The recent accessions to the navy of France and of America are probably among the incentives to this action. Formerly the United States, by their isolated position, felt to a considerable extent exempt from the necessity of entering into competition with other powers in the matter of armament. It is to be hoped that a race for nominal supremacy on the sea shall not be participated in by this country. The construction and maintenance of useless ironclads is only a degree removed from the almost intolerable burden of a standing army. It is really to be hoped that the improvement of ordnance will make these expensive and useless ships as extinct in naval warfare as personal armor is in land fighting. Then passenger ships could be pressed into service if needed. Apart from this, the proposal is a very impressive one. The ships will compare in tonnage with the Great Eastern, and will be the precursors of fleets that will dwarf all existing craft from their number and weight. This is certain to ensue, because the other great nations will follow in the lead of England. Yet the hope is expressed by the government that other powers will not attempt to rival England, as she has not attempted to rival them in her land forces. This reads like an apology for so immense a demand, but it is to be feared that the Continental powers will not see it in that light. If carried out, it probably will mean increased expenditure of national revenues by all nations, so that England's hundred millions will be but a fraction of the useless expense that will be lavished on the world's destructive navies.

A RIVAL FOR JUTE.

One of the characteristic features of the industrial discoveries and inventions of the day is the development of new fibers. Jute, for many years, has held a prominent place, and has acquired such importance that it has come to be looked upon as a necessity. A combination of manufacturers and dealers have, to a great extent, controlled the market, but now it is said that the pine needle has proved sharp enough to prick some very serious holes in the trust. Unquestionably the pine needles contain a fiber, but the problem of economically extracting it without impairing its length or tenacity was hard to solve. A typical patent is one granted to William Latimer, of Wilmington, N. C. He proposes to utilize the fiber principally for the manufacture of bags for inclosing cotton bales. As a material for the latter purpose, jute has long reigned supreme. The treatment of the "needles" is a simple one. The outer coating of the leaves is silicious in composition, while the inner parts are resinous and pulpy. Hence Mr. Latimer proposes to energetically attack and destroy the outer coating first, and then to apply a more moderate treatment to the easily disposed of chlorophyl and resin of the inner portions of the leaf.

The needles, preferably green, are placed in a tank, and are pressed down by a grating and screw against its bottom, so as to be tightly compacted. A solution of caustic soda of three per cent or four per cent strength is then introduced, until the mass is about covered. Steam is then turned on, and the temperature kept at 212 degrees Fahrenheit for ten or fifteen minutes. A head of foam forms on the solution, which is accepted as the index of the completion of the first step. The screw is now loosened, and the solution, which contains considerable silicate of soda, is allowed to act upon the leaves for about ten hours, the temperature varying from 208 deg. to 70 deg. Fahr. The gummy and resinous matters are saponified, and the fiber is left uninjured as regards length of staple or tenacity. The soda solution is run off, and the fibers are washed repeatedly with clear water at various degrees of heat. After this the fiber is ready for mechanical treatment by regular processes. In the successive washings the temperature is reduced step by step, but never is allowed to fall below 70 degrees Fahrenheit. This is thought to favor the production of a clean fiber.

It is interesting to think that in her pine forests the South has ever growing the fiber for her cotton bales, and we hope the process may attain a wide application.

THE CELESTIAL WORLD.

THE OCCULTATION OF JUPITER.

There will be an occultation of Jupiter by the moon on the morning of the 24th. The occultation will be visible in Washington, though the sunlight will greatly interfere with the observation. The immersion of the planet takes place at 6 h. 42 A. M., and the emersion takes place at 7 h. 43 m. A. M. in standard time at Washington. The occultation continues 1 h. 1 m. The sun rises on the 24th at 5 h. 42 m. A. M., and the occultation commences an hour after sunrise.

The moon at that time has just entered upon her last quarter, and is near the meridian. She may be easily found as a half moon, taking on the cloud-like aspect that marks her appearance in daylight. Jupiter is now bright enough to be seen with the naked eye in full sunlight, but it is a difficult matter to find him, and requires exceptional visual power. Keen-eyed observers may succeed in picking him up as a cloudy point a little further scuth than the moon, if they begin to look a short time before the occultation. They will see him apparently approach the moon, disappear behind her bright limb, and reappear after an hour's absence, from behind her dark limb, or where it would be, if it were not hidden in the sunshine.

The time and continuance of the occultation are given for Washington. They will differ in other localities where the phenomenon occurs, on account of the parallax of the moon. In Providence, R. I., the immersion of the planet takes place at 6 h. 55 m. A. M., and the emersion takes place at 7 h. 50 m. A. M., standard time, the occultation continuing 55 m. The difference is due to the different direction of the moon when seen from two different points like Washington and Providence.

An occultation of Jupiter is a sight worth seeing, even in the daytime. It is infinitely more interesting if it occurs when the sun is below the horizon, and can be observed in a powerful telescope. If the moon be then passing from the full to new, the Prince of Planets, nearly as large as the moon to the unaided eye, seems to plunge headlong beneath the moon's bright limb, and reappear when the occultation is over beyond the moon's dark limb with the suddenness of a new creation starting from the sky depths. An opera glass will be a valuable aid to observers of the occultation of the 24th, and a telescope will bring out the picture with marvelous effect.

Jupiter is occulted nine times during the year, but only two of the occultations are visible at Washington —one on the 24th and the other on September 3.

Observers should prepare themselves for the occultation by a view of the charming morning star and the moon before the dawn in the southeast, in order to fix in the mind their relative position and place in the heavens.

How Many Minutes Have Passed at the End of the Year 1888, Calculating from the Beginning of the Christian Era?

This question has recently been answered in an interesting article published in a German journal, the Munich *Neueste Nachrichten,* with the surprising result that not a milliard minutes have passed. The calculation is as follows: 1888 multiplied by 365 days equals 689,120 days, to which must be added 460 leap days, making a total of 689,580 days, which contain 16,549,920 hours, or 992,995,200 minutes, that is 7,004,800 minutes less than a milliard.

The milliard minutes will be reached in the year 1902, on the 28th of April, at 10:40 A.M.

Taking in consideration that the indemnity paid by France to Germany after the war of 1870–71 amounted to 5 milliard francs, it follows that if this sum were to be paid at the rate of 5 francs (about $1.00) for every minute since the beginning of the Christian era up to date, that sum would not have been paid yet at the present time.—*T. G. H.*

Newspaper Notes.

Mr. Moses Y. Beach, of this city, has lately become the editor and proprietor of the Berkshire County *Eagle*, published at Pittsfield, Mass. Mr. Beach is a grandson of the late Moses Y. Beach, formerly of Springfield, Mass., afterward widely known as the enterprising proprietor of the New York *Sun*.

Mr. Beach, of the *Eagle*, is a native of Connecticut. Although quite a young man, he has had much newspaper experience, having served several years on the *Graphic* and other papers, and for the past six years on the New York *Tribune*. He "can boast of a high ancestral name," being a lineal descendant of Elder William Brewster, who came over in the Mayflower, and of Elihu Yale, founder of Yale University.

The *Eagle* is one of the ablest newspapers in Western Massachusetts, and perhaps the oldest. It was established in 1789, one hundred years ago, the year Washington became President.

The first newspaper in America was the Boston *News Letter*, which was first issued by John Campbell on Monday, April 24, 1704; it was regularly published for nearly seventy-two years. The second was the Boston *Gazette*, begun December 21, 1719. The third was the *American Weekly Mercury*, issued in Philadelphia on December 22, 1719. James Franklin, an elder brother of Benjamin, established the New England *Courant*, August 17, 1721.

The first steam printing press for newspapers was that used on the *London Times*, November 28, 1814.

Sir William Pearce.

The recent death of Sir William Pearce, in his 56th year, arrests in his career one of the most eminent engineers of naval constructions of our epoch. Sir William was born at Brompton, England, on the 8th of January, 1833. After his studies at the government school at Chatham, he was, although still a young man, selected by the Admiralty to superintend the construction of the Achilles, the first iron ship built at the government dockyards.

Later on he assumed the direction of the Napier dockyards, on the Clyde, where he obtained a brilliant renown. A few years afterward (in 1870) he took possession of an important station at Fairfield, where, in concert with the near relatives of Mr. John Elder, he continued and developed the famous house of John Elder & Co., of which he became the head in 1878.

It was at this epoch that he conceived those grand plans for the construction of packets with which his name has remained associated.

Under his direct supervision, there were constructed in his shipyards a number of vessels of more than 200,000 tons burden, and of nearly 300,000 H. P., for a sum exceeding $35,000,000.

The first of the series of transatlantic vessels was the Arizona, built for the Guion line. This was followed by the Alaska and the Oregon, whose speed was exceeded only by that of the Umbria, which, with a few important modifications, was of the same model.

Nearly at the same epoch he built the North German Lloyds' fleet, consisting of ten magnificent packets. Afterward came the New Zealand Shipping Company's fleet, whose success is well known, and which reduced the distance of the antipodes to 36 days from England, and of Sydney to 38 days from Plymouth.

In the construction of vessels of less size than those cited above, Sir William was no less successful. It is, in fact, due to him that the passage from Dover to Calais can be, for the first time, effected in less than an hour.

His great technical knowledge, activity, and remarkable energy, and his ability to distinguish capable men, permitted him to establish the vastest shipyards in the world.

The extraordinary rapidity with which he built a 5,000 ton steamer—in the incredible space of 98 days—will long be remembered.

It was likewise due to his great energy and to the remarkable organization of his establishments that, at the time of the Soudan war, he built, in 28 days, 11 stern-wheel vessels for the navigation of the Nile, and that he was enabled to deliver them at Alexandria two days before the expiration of the contract. It was for the same destination, too, that he constructed a hospital boat in the space of 21 days—a feat that procured for him the earnest felicitations and thanks of Lord Hartington, then minister of war.

Sir William was elected a member of Parliament in 1885, and was made a baronet in 1887.