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Improved Marine Clock and Register.

In order to tell the exact number of revolutions made by any machine it is necessary to have a self-registering counter which shall accurately record every stroke made by the engine or other machine to which it is attached. By this means the distance traveled by a steamship can be approximately ascertained. The log of the engine being compared with that of the ship affords some data for estimating the duty done by the machinery. The engravings herewith illustrated represent a marine clock and indica-

New York City. Further information can be obtained by addressing Davison, Dickinson & Co., 229 Broadway, New York.

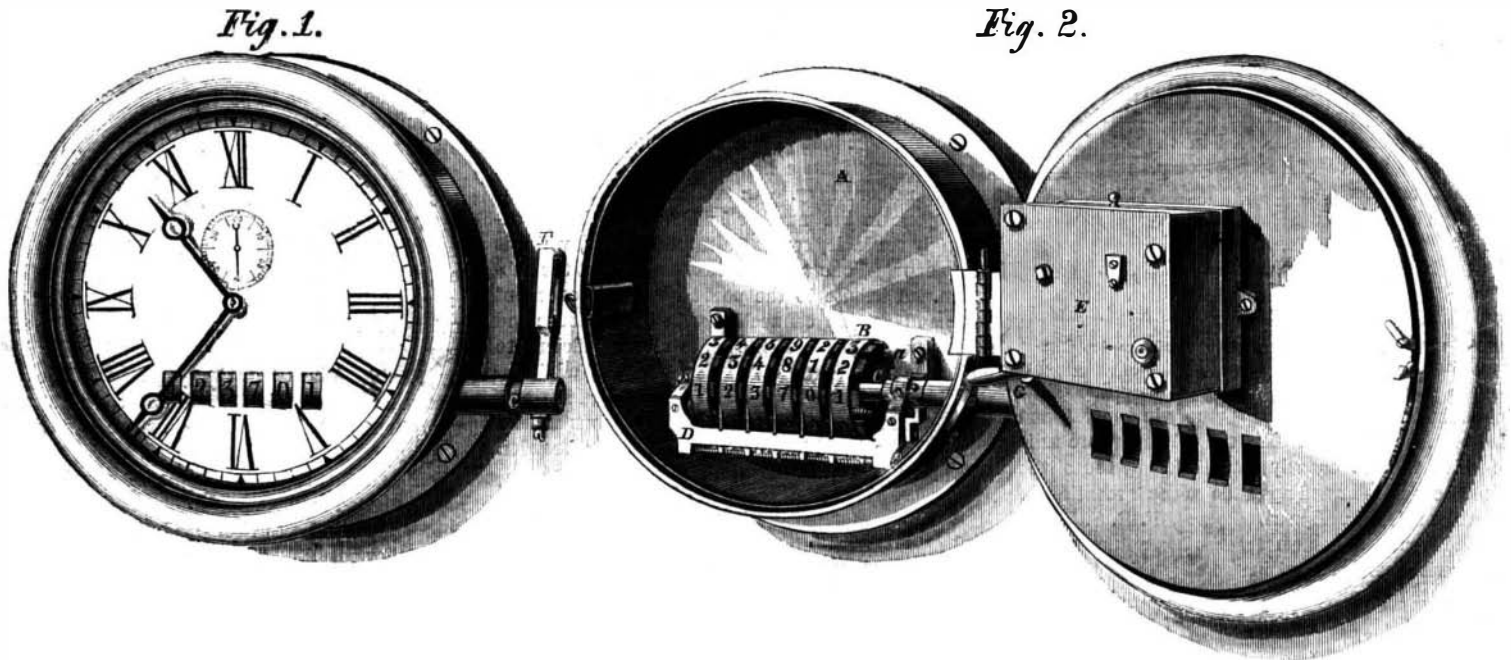
GUN-COTTON FOR CANNON.

At the last anniversary meeting of the Royal Society of England, in the President's Address, delivered by Major-General Sabine, are the following remarks on gun-cotton:—

“The application of gun-cotton to warlike purposes and engineering operations, and the recent improve-

ing under its own auspices a full and searching inquiry into the possible applications of gun-cotton in the public service.

“The absence of smoke, and the entire freedom from the fouling of the gun, are points of great moment in promoting the rapidity of fire and the accuracy of aim in guns employed in casemates or in the between-decks of ships-of-war; to these we must add the innocuous character of the products of combustion in comparison with those of gun-powder, and the far inferior heat imparted to the gun itself by repeated



GIROUD'S MARINE CLOCK AND REGISTER.

tor, or engine register, combined in one case, A. The small disks, B, have numbers on their faces and are all fastened to the shaft, C; this shaft is worked from the engine by the arm, F. The frame, D, carries all the disks, and, by means of appropriate devices not seen in the engraving, the disks are caused to rotate and stop for every stroke of the engine; this concealed apparatus acts on the jogs, a, to produce this effect. When the register is first set, all the disks are turned at 0, so that they represent nothing, numerically, through the small square loop holes in the clock dial. As the engine makes one revolution the left hand disk also turns and registers 1; when 9 turns have been made, the disk next to the first turns with it; thus registering 10; the first disk then goes on again while the second one stops, thus counting up to 19, when the second one turns again counting 20, and this continues until the whole number of disks have been turned. The other appurtenances, such as the clock movement, E, are very highly finished and there is a fixed handle at G by which the works are wound up as it becomes necessary to do so. This handle is so connected with a ratchet wheel and pawl that, as it is worked back and forth, the spring moving the clock works is wound up; those details are behind the dial enclosed in the box, E, and cannot be shown; there is also another arrangement of a pinion, in connection with the hands, which, together with the previously-mentioned winding handle, constitute a great improvement in marine winding clocks. This invention was patented on Nov. 3, 1863, through the Scientific American Patent Agency, by Victor Giroud,

ments in its manufacture, have been the subject of a report prepared by a joint committee of the chemical and mechanical sections of the British Association, consisting chiefly of Fellows of the Royal Society. The report was presented at the meeting in Newcastle in September last, and is now in the press. The committee had the advantage of personal communication with General von Lenk, of the Imperial Austrian Artillery, the inventor of the system of preparation and adaptation by which gun-cotton has been made practically available for warlike purposes in the Austrian service. On the invitation of the Committee, and with the very liberal permission of the Emperor of Austria, General von Lenk visited England for the purpose of thoroughly explaining his system; and we have in the report of the Committee the information, thus gained directly from the fountain-head, of the results of his experience in the course of trials extending over many years; together with additional investigations by individual members of the Committee.

“The advantages which are claimed for gun-cotton over gun-powder for ordnance purposes and mining operations are so many and so important as to call imperatively for the fullest investigation. Such an inquiry, however, in its complete sense, is both beyond and beside the scope and purposes of a purely scientific body; and the British Association have done well—whilst reappointing the Committee to complete certain experiments which they had devised, with the view of clearing up some scientific points which are more or less obscure—in pressing on the attention of her Majesty's Government the expediency of institut-

and rapid discharges. With equal projectile effects, the weight of the charge of gun-cotton is but one-third of that of gun-powder: the recoil is stated to be reduced in the proportion of 2 to 3, and the length of the gun itself to admit of a diminution of nearly one-third. These conclusions are based on the evidence of long and apparently very carefully conducted courses of experiment in the imperial factory in the neighborhood of Vienna. The results appear to be especially deserving the attention of those who are engaged in the important problems of facilitating the employment of guns of large caliber and of great projectile force in the broadsides of our line-of-battle ships, and in reducing, as far as may be possible, the dimensions of the ports.

“In the varied applications of explosive force in military or civil engineering, the details of many experiments which bear on this branch of the inquiry are stated in the report of the Committee, and appear to be highly worthy of consideration and of further experiment.

“It cannot be said that the advantages now claimed for gun-cotton are altogether a novel subject of discussion in this country. When the material was first introduced by Schonbein in 1846, its distinctive qualities in comparison with gunpowder were recognized, although at that period they were far less well ascertained by experiment than they are at present. To the employment of gun-cotton, as then known, there was, however, a fatal drawback in its liability to spontaneous combustion. The elaborate experiments of General von Lenk have shown that this liability was

due to imperfection in its preparation, and ceases altogether when suitable processes are adopted in its manufacture. Perfect gun-cotton is a definite chemical compound; and certain processes for the removal of all extraneous matter and of every trace of free acid are absolutely indispensable. But, when thus prepared, it appears to be no longer liable to spontaneous combustion; it can be transported from place to place with perfect security, or be stored for any length of time without danger of deterioration. It is not impaired by damp; and may be submerged without injury, its original qualities returning unchanged on being dried in the open air and in ordinary temperature.

"A scarcely less important point towards the utilization of gun-cotton, and the safety with which it may be employed in gunnery, is the power of modifying and regulating its explosive energy at pleasure, by means of variations in the mechanical structure of the cartridge, and in the relative size of the chamber in which it is fired.

"The experiments made by the Austrian Artillery Commission, as well as those for blasting and mining, were conducted on a very large scale; with small-arms the trials appear to have been comparatively few.

"There can be no hesitation in assenting to and accepting the concluding sentence of the Committee's report:—'The subject has neither chemically or mechanically received that thorough investigation that it deserves. There remain many exact measures still to be made, and many important data to be obtained. The phenomena attending the explosion of both gun-cotton and gun-powder have to be investigated, both as to the temperature generated in the act of explosion, and the nature of the compounds which result from them under circumstances strictly analogous to those which occur in artillery practice.'

NEW BOOKS AND PUBLICATIONS.

THOMAS, ON RIFLED ORDNANCE—Illustrated. D. L. Van Nostrand, publisher, 192 Broadway, New York.

In the present dearth of really good and popular text-books on the science of gunnery in general, and rifled ordnance in particular, the volume before us is one which will be eagerly sought for by those who seek to be well informed upon the subjects mentioned. The author is Mr. Lynall Thomas, F. R. S. L., an English inventor of some note, who has not contented himself with merely theorizing on the subject, but has demonstrated his arguments by practical tests against other weapons. Apart from the merit of the work in this respect, the manner in which the author expresses himself is worthy of the highest praise. Even to the professional individual, the study of machinery, or of theories connected with it, requires the closest mental application to master their intricacies, but when the labor is added to by the obscure phraseology, ungrammatical phrases, and defective technology of the writer, the task becomes too wearisome to be prosecuted, and many an ingenious theory and practical plan is thrown aside solely because the author has presented it in so forbidding a manner. No such fatal defects mar this work, and so happy is the style throughout that even those who have little or no knowledge of rifled ordnance cannot fail to acquire much valuable information by a perusal of the work under discussion. A brief synopsis of the table of contents shows the following interesting articles:—"On Rifled Cannon," comprising 9 pages; "On the Turn of the Rifling," 14 pages; "Influence of the Caliber on the Turn," with illustrations, 37 pages; also the form of the grooves, flight of projectiles and a new theory on the action of fired gunpowder. We have derived much valuable information from a hasty perusal of the work and shall return to it with pleasure as an opportunity affords. The mechanical execution of the work is good, and it is one which might adorn any parlor table. Price \$2.

DANA'S ELEMENTARY GEOLOGY. By James D. Dana, LL.D., Professor of Geology in Yale College. Published by Theodore Bliss & Co., Philadelphia.

This is the title of a new "Text Book of Geology," designed for schools and academies. It is illustrated with three hundred and seventy-five cuts, is of a convenient size, and is well printed on good paper. In this work geology is treated as a history of the geo-

graphical changes of the globe, or those of its continents and seas, through successive ages, and a history of the progress of life from the earliest species up to man. The illustrations given of the science of geology are mainly drawn from American rocks; and it is truly a geological history of the American continent. It is a clear and able production, such as we would have expected from its eminent author. It will supply a want long felt in our high schools and academies.

MANUAL OF ELEMENTARY PROBLEMS IN LINEAR PERSPECTIVE. By P. Edward Warren, C. E., Professor of Scientific Geometry, &c., at the Rensselaer Polytechnic Institute. Published by John Wiley, 535 Broadway, New York.

Drawing is a science and an art; therefore to acquire a correct knowledge of it, the principles upon which it is based must be thoroughly understood. In this little volume of Professor Warren's, the principles of the art are very clearly illustrated and explained. It is divided into two parts, consisting of "primitive methods" and "derivative methods." A practical knowledge of the art of drawing is indispensable to architects, engineers and mechanics; and it is useful to all who are engaged in any of the arts requiring graphical representation or design. The author of this volume is a most competent person for the production of such a useful work.

THE ATLANTIC MONTHLY. Ticknor & Fields, Boston, Mass.

The ever welcome *Atlantic* comes to us regularly with its honest brown face and table of contents full to overflowing of interesting essays, tales, poetry, &c. The poetry of the *Atlantic Monthly* is uniformly of a high character; but the essays, though doubtless clear, are sometimes a little drawn out and (must we say it?) rather heavy. An article on "Genius," the leading one in the number for February, though exceedingly readable, covers 19 mortal pages, which is space enough, one would think, to exhaust the subject in. A tribute to the poet Bryant is in excellent taste; and this, in connection with the "House and Home" papers of Mrs. Stowe, is alone sufficient to render the number an interesting one. In addition, Agassiz contributes an article on the "Glacial Period," and there are a number of other miscellaneous articles which will be found interesting to the general reader. The *Atlantic* is for sale by all periodical dealers.

APPLETON'S POSTAL GUIDE. D. Appleton & Co., 443 Broadway.

We have received a copy of "Appleton's Postal Guide" from the publishers, which is published quarterly, carefully corrected and revised. We have had occasion to consult previous issues of this work and have found it an invaluable assistant in correcting the omissions of careless correspondents who have omitted their place of residence or the State and County they reside in. The guide contains a complete list of all the post-offices in the country, and is an authorized medium of information between the Post-Office Department and the public. Price, \$1 per annum.

"THE PHILADELPHIA PHOTOGRAPHER."—This is the title of a new publication of which the first number is now before us, and a splendid specimen of the typographical art it is. A most beautiful photograph of the painting, "The Loan of a Bite," also accompanies it. The *Philadelphia Photographer* is a monthly work, at \$3 a year. Each number is to be adorned with a photographic picture, worth of itself the price of the monthly part. The contents are of an interesting nature, and to all photographers will be useful and valuable; for they are evidently the productions of clear-headed, practical men. Our new cotemporary promises to be a valuable acquisition to the cause of progressive science; and we hail its appearance with pleasure. We wish for it the highest success. Benerman & Wilson, publishers, Philadelphia; Anthony, New York.

LATHES that do not bore straight holes can easily be altered without reboring the boxes the spindle runs in. Take a piece of tin, or metal of any thickness, and place it between the V of the shears and that in the head-stock of the lathe; this will throw the spindle in line with the shears again, so that it will bore parallel. Of course, the lining must be placed on the opposite side of the head-stock that is "out" of line, so as to bring it back. This is a quick and certain method of making a lathe bore a straight hole.

PRODUCTION AND CONSUMPTION OF COFFEE.

The two principal sources from which Europe is supplied with coffee are Java and the Brazils. The total annual production of coffee in the world may be estimated in round numbers at six millions of cwts., of which Europe alone consumes four and a half millions, or three-quarters of the whole quantity produced. It appears that, comparatively speaking, the greatest consumption is in little Switzerland, where it amounts annually to 12 lbs. per head of the whole population; that Holland, with its two and a half millions of inhabitants, drinks as much coffee as the thirty-six millions in France; that Belgium and Holland consume nearly 10 lbs. per head; that the Zollverein and Germany consume 4 lbs. per head, and the other countries only about 1 lb. per head. In Great Britain the consumption of coffee in 1862 was 309,500 cwts., which is equal to 1 lb. and eighteen-hundredths of a pound per head, taking the population at 29,193,397—the result of the census of 1861. In most parts of Europe the consumption of coffee has been rapidly increasing during the last few years, whilst almost everywhere it is capable of still greater extension, especially in the colder and more northern climates. On the other hand, it is demonstrated by statistics that the great wine-producing countries of Europe—Spain, Portugal, Italy, and Greece—consume comparatively but little coffee; and no doubt that France might be classified among these latter, were it not that the coldness of the climate of one-third of that empire—say from the latitude of Paris to the British Channel—prevents the grapes from ripening in that zone, and therefore opens the door for a larger consumption of coffee.

In Java the production of this berry has been at a stand-still for several years, as the Dutch Government finds it more profitable to increase the cultivation of sugar. Central America has for some time past been torn by dissensions and civil war, so that the inhabitants have neither time nor confidence enough in the future to turn their attention to the extension of their coffee plantations, which, unlike sugar, rice, and cotton, require several years before they attain maturity and bear crops. The other countries producing coffee are mostly islands, and having but a certain limited area, there is not much room for planting more coffee-trees.

The Brazils alone seem capable of growing coffee to an unlimited amount from the vast extent of their thinly populated territory; but, from various causes, they remain stationary, and, from a defalcation of their crops during the last two years in succession, the exports from that empire have even been considerably less than in previous ones. This failure of the crops is partly owing to climatic influences of an unfavorable nature, and partly to a disease that attacks the coffee-trees in certain localities, much in the same way as the vines are affected by the ravages of the oidium. It must also not be overlooked that the price of labor has of late risen to an enormous and unprecedented height in the Brazils, in consequence of a want of sufficient influx of population, owing to the suppression of the slave-trade as a legal branch of commerce, and the increased difficulty, risk, and expense of smuggling in fresh supplies from Africa; so that the present high prices of coffee bring to the planters a less advantageous return than did formerly lower prices combined with the payment of less wages for labor. Whilst it was previously the invariable custom to under-estimate the crops in order to keep up the prices of coffee in the European markets, the very reverse is at present the case, as is illustrated by the crop of 1862-1863, which now turns out to be considerably less than the original estimate. The reason for this alteration of tactics may be accounted for by the fact that among the Brazilian coffee-planters there are many possessed of but very limited capital, who endeavor to keep up their credit by exaggerating the produce of their crops, by which they are enabled to obtain larger advances from the merchants to carry on their operations. In former years of peace and commercial prosperity, the United States used to import from the Brazils alone no less than a million and a quarter of bags of coffee annually; whereas, since the commencement of their unhappy dissensions, their imports from the same quarter have been reduced to 350,000 bags. As soon as the war is brought to a close, as it must sooner or later, there can be no doubt but that the Americans will again