

been established, and artistic taste has been developed in a way to make the work done of greater value and more attractive, with a corresponding increase in the value of labor. From Nurnberg alone there are now sent out some 23,000 tons of toys, the price lists of which number 16,000 different designs. Since the introduction of steam machinery into the toy industry of this place the annual product has increased twenty-fold. At Sonneberg, in Thuringia, not long ago a small hamlet, but now quite a city, the annual production of toys amounts to some \$10,000,000.

**THE NEW WOODRUFF SCIENTIFIC EXPEDITION.**

Bacon's ideal college was surrounded by a park, which should contain the "raw materials" of all knowledge. The tendency of education in recent years has been to make Bacon's ideal real. Witness the splendid grounds, museums, libraries, and in many cases elaborate workshops, attached to our representative institutions of learning. But the world cannot be brought within the compass of a park. The raw materials of knowledge are not all transportable. Consequently, he who would study man and nature at their best, in the fullness of life and activity, must pursue the quest of knowledge the world over. Accordingly Mr. Woodruff would outdo Bacon, make the whole world his park of learning, and carry his college around the globe.

That an enterprise so novel and radical in character should meet with many obstacles, is not to be wondered at, nor that it should have taken nearly three years for its managers to reach a point at which they could say "we are ready." It is to be hoped that no lack of candidates will prevent the sailing of the expedition so liberally planned and fitted out. The accompanying engraving shows the steamer General Werder, selected for the voyage, and certified by the United States Navy Department as suitable in all respects for the purposes of the expedition.

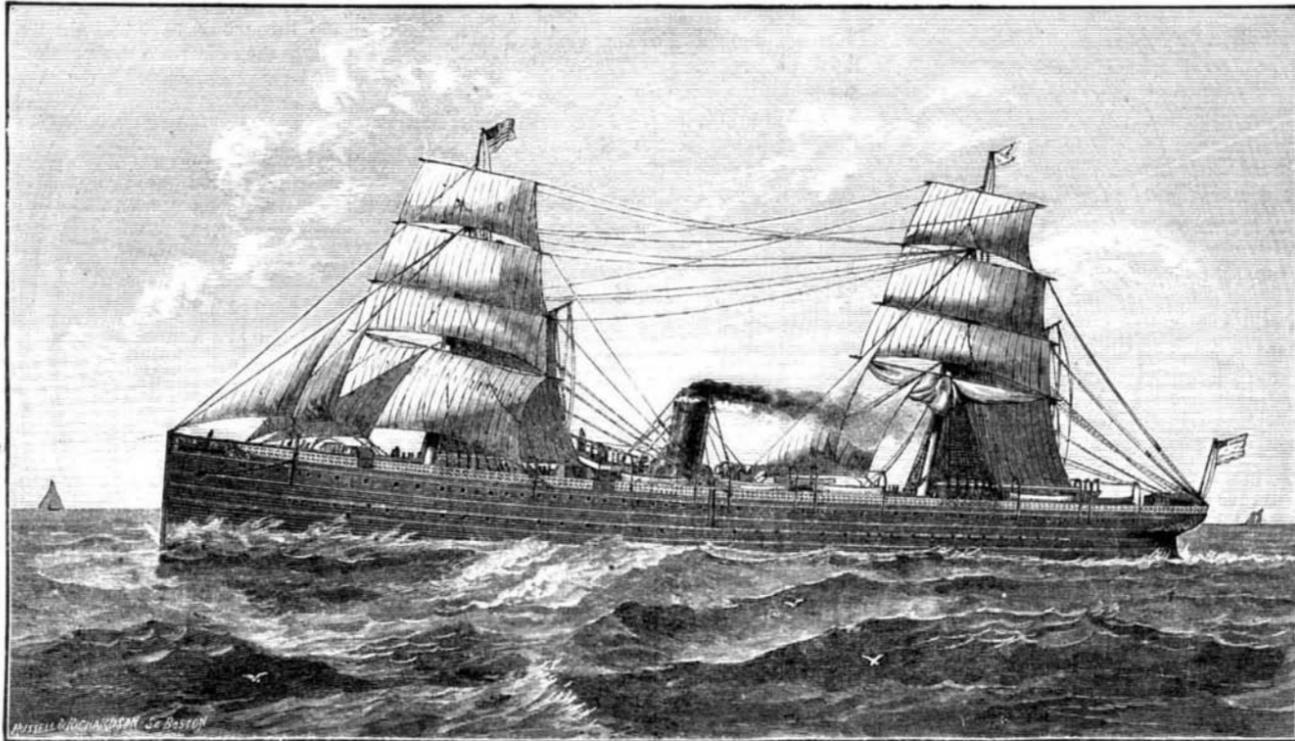
The Director wishes it to be distinctly understood that the expedition is neither a money making speculation, nor yet a visionary philanthropic scheme; but an educational enterprise of great magnitude and importance, conducted on sound and legitimate business principles. The managers have no other pecuniary interest in the expedition than to make it self-sustaining. It is expressly provided by Act of Congress that no mercantile or commercial venture shall enter into the plan of the voyage. The financial basis of the enterprise is perfectly sound. Every possible assurance of the fulfillment of their contract is given by the managers, who are bound, by every provision that could be reasonably required, to the exact terms of the agreement between themselves and the patrons and trustees of the expedition.

The collegiate department is to be under the control of President W. S. Clark, LL.D., of Amherst, Mass. The ship will be commanded by Commander A. P. Cooke, United

States Navy; while the financial affairs of the expedition are intrusted to Drexel, Morgan & Co., bankers of this city. The whole plan and purpose of the expedition is educational. It involves a voyage around the world, to be performed in sixteen months, devoted to the education of youth and the recreation of tourists. For the students the expedition will constitute a floating college, in which the usual course of instruction will be complemented by object teaching on a grander scale than has ever before been attempted, while to the tourist it offers many advantages for sight seeing.

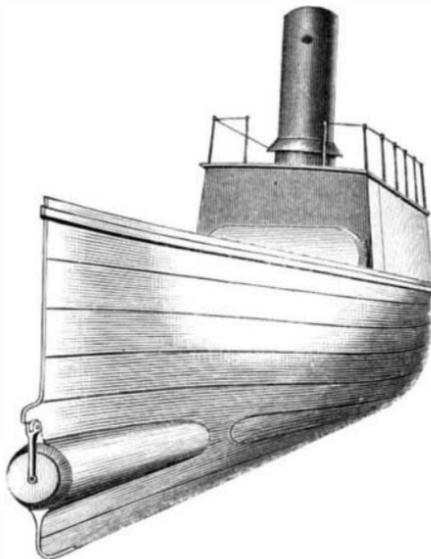
The route selected has been decided upon, after mature

on a carefully considered route around the globe. The commerce, manufactures, arts, manners, and customs of the principal nations of the earth may be successively compared, and their elements of strength or weakness be ascertained by actual observation. The geology, geography, zoology, and botany of many foreign countries will be investigated by the scientific corps. Extensive collections in the various departments of natural history will be brought home, which will serve to enrich our National Museum, and may become the basis of important scientific publications. Special attention will be paid to instruction in mathematics, navigation, and practical astronomy. The knowledge to be acquired on this expedition is, in short, equally adapted to the requirements of the professed scientist and the man of business.



**THE STEAMER GENERAL WERDER OF THE NEW WOODRUFF SCIENTIFIC EXPEDITION.**

deliberation, as one most likely to bring the party to the different ports at the most favorable seasons of the year. In planning the course of the vessel, all that careful foresight can provide for has been taken into account, yet it is scarcely to be expected that every step of the projected route can be followed. It is not possible to participate and provide against chance of detention with such certainty as to foresee the precise time of reaching and leaving a given port. It may become necessary to modify the proposed route in some of its details; but the managers give the strongest and most positive assurance that no expense will be spared and that no effort will be wanting to conduct the voyage in good faith according to the letter and the spirit of the programme announced. As already said, the voyage will take about sixteen months, which length of time is deemed



**EXTERIOR OF THE "DESTROYER."**

rigged, with compound engines of the latest type, and duplicates of all machinery, screw, etc., liable to accidents. It is provided with spacious accommodations, the best ventilation, a full complement of boats, and every modern appliance for health, safety, and comfort.

**Recuperating the Brain.**

An intelligent writer on this subject thinks the use of stimulants to fortify the exhausted brain an unwise measure. The best possible thing, he says, for a man to do when he feels too weak to carry anything through is to go to bed and sleep as long as he can. This is the only recuperation of the brain power, the only actual recuperation of brain force; because during sleep the brain is in a state of rest, in a condition to receive appropriate particles of nutriment from the blood, which take the place of those which have

been consumed by previous labor, since the very act of thinking burns up solid particles, as every turn of the wheel or screw of the steamer is the result of consumption by fire of the fuel in the furnace. The supply of consumed brain substance can only be had from nutritive particles in the blood, which were obtained from the food eaten previously, and the brain is so constituted that it can best receive and appropriate to itself those nutritive particles during the state of rest, of quiet and stillness of sleep.

**Large Magnet.**

MM. Ducretet et Cie. exhibited at the Paris Exhibition

a Faraday electro-magnet, alleged to be the most powerful ever made. The coils have a diameter of 50 centimeters (19.7 inches), and a height of 60 centimeters (23.6 inches). The total weight is 950 kilogrammes (2,193.6 pounds). The helixes are made up of numerous parallel and separately insulated wires in order to facilitate different combinations, both in tension and in quantity.

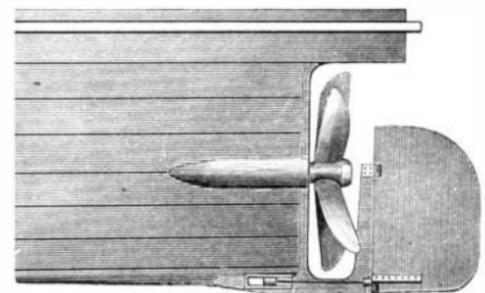
**Correspondence.**

**Submarine Attack.**

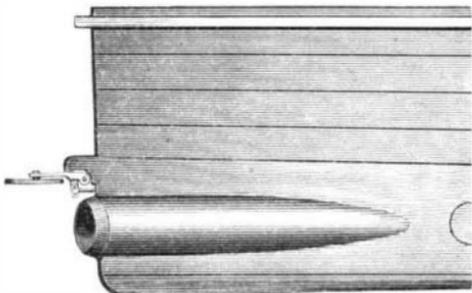
To the Editor of the Scientific American:

The excellent engraving of a submerged spar torpedo, inserted in the last issue of the SCIENTIFIC AMERICAN, will no doubt be examined with great interest by the nautical readers of the journal who have studied the subject of national defense against iron clad ships. The similarity of Admiral Porter's device introduced in the torpedo boat Alarm, and that which Mr. Ten Eyck presented to the Navy Department, as he says, 17 years ago, will call forth discussion regarding priority of invention and the relative merits of their systems.

Mr. Ten Eyck, although he declines to exhibit the "manner of working the spar," has shown the detail of the essential parts of his contrivance so clearly that the professional reader can have no difficulty in comprehending the simple



**STERN OF THE "DESTROYER."**



**BOW OF THE "DESTROYER."**

States Navy; while the financial affairs of the expedition are intrusted to Drexel, Morgan & Co., bankers of this city.

The whole plan and purpose of the expedition is educational. It involves a voyage around the world, to be performed in sixteen months, devoted to the education of youth and the recreation of tourists. For the students the expedition will constitute a floating college, in which the usual course of instruction will be complemented by object teaching on a grander scale than has ever before been attempted, while to the tourist it offers many advantages for sight seeing.

The expedition will visit the principal points of interest

sufficient for the full attainment of the objects of the expedition. It is estimated that about three quarters of the time will be spent in port. Numerous inland excursions for study and observation will be made at the expense of the management and under the guidance of the Faculty.

The fee to be paid by students and tourists is fixed at \$2,500. Expenses when away from the ship, washing bills, and other personal matters extra. It is proposed that the expedition shall sail May 8th next, and return in September, 1880. The chosen vessel is certified by the Navy Department to be staunch and commodious in every particular. It is 360 feet long, 40 feet beam, 3,000 tons burden, brig-

and effective character of his manner of working the spar and exploding the torpedo. At the same time the engraving shows with sufficient distinctness that the projecting "snout" which surrounds and protects the spar arrangement is solid, and hence capable of sustaining the concussion with the enemy's ship during attack, unavoidable even at low speed. The snout of Admiral Porter's torpedo boat Alarm, it should be observed, lacks solidity, an important fact pointed out by the SCIENTIFIC AMERICAN of July 19, 1873. The editor, in analyzing the properties of the Alarm, observes: "Although built with a snout, ramming is only a secondary means of attack. In fact, the bow is not a solid piece, but

built out some twenty feet in order to allow the torpedo to be thrust forward well in advance of the boat." It needs no demonstration to convince naval architects that the snout ought to be, as depicted in Mr. Ten Eyck's drawing, perfectly solid. The complete destruction of the snout or ram of the German ironclad König Wilhelm in the British Channel, last year, by a very moderate concussion with its consort, Grosser Kurfurst, shows what would happen to the snout of Admiral Porter's torpedo boat during attack. The superstructure of the vessel forming a distinct element, it is not necessary on the present occasion to inquire whether by some mysterious process the peculiar deck-house of the Destroyer really appeared on the plan "submitted to the Naval Department" seventeen years ago. As to the spar employed by Mr. Ten Eyck, the method of passing the electric wire through the piston will be approved by practical men, also the plan adopted of guiding the motion of the spar by a tube, as it insures accurate movement under all circumstances. Nor will the simple expedient of introducing the torpedo through an oval opening at the top of the tube be overlooked by those who closely scrutinize the arrangement illustrated in the SCIENTIFIC AMERICAN.

But the assumption of Mr. Ten Eyck, that his plan of employing a spar torpedo resembles the system of submarine attack inaugurated by the Destroyer, is simply absurd. Whether the spar be permanently submerged, agreeably to the device of Admiral Porter and Mr. Ten Eyck, or suddenly submerged as practiced in steam launches, its action differs altogether from that of the projectile torpedo discharged by my torpedo vessel. The transverse section of this projectile torpedo, it should be mentioned, is square, and its length 23 feet, pointed at both ends, thus presenting opposite wedges whose sides are vertical. The weight is 1,400 pounds, and the initial velocity on leaving the torpedo vessel 290 feet per second, corresponding with a rate of 170 nautical miles per hour. The projectile, therefore, starts on its hostile mission with a kinetic energy or *vis viva* of nearly 2,000,000 foot-pounds, quite enough under all circumstances to propel the weapon a sufficient distance for effective attack.

From obvious reasons I decline furnishing a description of the mode of manipulating the destructive implement which the Destroyer has been built to convey, my principal object being that of exposing the absurdity of the assumption of Mr. Ten Eyck that his spar torpedo resembles my invention. It will be well to mention, for the information of those who are not familiar with the history of the torpedo, that I submitted to Emperor Napoleon III., during the month of September, 1854, drawings of a torpedo vessel provided with a submerged cylindrical chamber and appropriate valves for expelling a submarine projectile torpedo precisely as in the Destroyer, the only difference being that the projectile torpedo submitted to the French Emperor was cylindrical, 16 inches in diameter and 10 feet long, while the projectile of the Destroyer is square, and 23 feet long, as before stated.

J. ERICSSON.

#### Washington Correspondence.

To the Editor of the Scientific American:

The Commissioner of Patents has not at the time of this writing made out his report, but is hard at work upon it at such times as he can take from the current work of his office. It is understood that the report will be of much greater length than usual. The Commissioner is believed to be a hard worker, hearing all the appeals, etc., that he can himself, and hence his report may be a little later than usual.

Mr. Parkinson, the examiner in the class of harvesters, having resigned, Mr. J. B. Church was transferred from the class of metal working to fill this position, and Dr. Jayne, who formerly had charge of metal working, has resumed his old position. As Mr. Tilden, who formerly had charge of the household class, resigned some time since, there are two vacancies in the grade of principal examiner, which will be filled by a competitive examination which is to be held the first week in February.

#### CONGRESS.

The Senate is still engaged in tinkering at the patent law, and considerable talking has been done on the subject. Some of the Senators, judging from their speeches, did not appear to care how much they exposed their ignorance of the patent law and its beneficent workings so long as they, by their diatribes against patents and patentees, could curry favor with some of their constituents, who think that their interests are to some extent injured by patents. Senator Wadleigh made a very eloquent speech showing the benefits the patent law has conferred on this country and the world at large, and then urged the facts he presented as a reason for passing the present bill, which, in view of sections 2 and 11, will, if it passes, be the worst blow our patent system has had since its foundation. This seems about the same as using a eulogy on religion as a reason for passing a law to punish its professors. At this writing, section 2 is still under consideration, and it has received some pretty heavy blows from Senator Conkling, who appears to have a pretty good idea of the manner it would work in favor of the large corporations and against poor inventors.

There are as usual many applications for extensions of patents. Some of them are for patents that have already had an extension of seven years by the usual course of law, thus having had a life of 21 years, while others are of the seventeen year class, and have as yet had no extension. The following is a list of such cases as I could find:

R. F. Loper, improvement in shipbuilding.

Luther Hall, machine for shaping boot and shoe heels.  
D. M. Cook, sorghum evaporator.  
Alex. Twining, manufacture of ice.  
E. W. Bullard, hay spreader.  
A. F. Smith, locomotives.  
S. S. Turner, sewing machines.  
Aiken & Felthousen, sewing machines.  
Nathaniel Jones, shoe lasts.  
Edward L. Wilson, picture holder.  
Hubbard & Conant, steam engines.  
D. S. Stafford, cultivators.  
M. Mattison, packing flour.  
J. P. Clark, hydrants.  
Florian Grosjean, sheet metal spoons.  
L. F. Munger, locks.  
Jas. Wyman, setting staples in blind slats.  
Edgar Huson, wagon gear.  
B. F. Rice, paper bag machines.  
Sheldon Hartshorn, buckles.  
David Heustis, method of casting shot and shell.  
J. B. Read, projectiles.  
Cook & Jenkins, working zinc.  
Phillip Ulmer, camp spoons.  
Asa Johnson, joining sheet metal for roofing.  
M. A. Jones, pipe coupling.  
Gilbert Jessup, seeding machines.  
Van De Carr & Reynolds, brake for power looms.  
Albert Fuller, faucets.  
H. A. Stone, manufacture of cheese.  
W. R. Fee, cotton seed hullers.  
W. S. Carr, water closets.  
Ira Pusey, platform scales.  
McKay & Mathies, sole sewing machines.  
Birdsell, clover huller.  
C. E. J. Thornton, chain links.  
A. R. Arnold, machine for making twist drills.  
F. Cook, cotton bale tie.  
Strong & Ross, weighing scales.

Very few, if any, of these will pass the ordeal of both houses. Some of them have already been reported adversely, and may never be heard of again, although there is no knowing what may be done toward the close of the session. One of the most important cases is that of McKay & Mathies, boot and shoe sole sewing machine, used in all shoe factories. This one would suppose to have been a very profitable patent, as the users of the machine, in addition to paying a good round sum for it originally, have to pay a royalty from a half to four cents (according to the style) on each pair of boots or shoes made on it. This case is being very quietly but skillfully managed by the patentees, counsel, and may require some good management on the part of its opponents to beat it.

There are two names in the above list, namely, Aiken & Felthousen, that have appeared in every list of applications for extensions for seven or eight years past, but so far have met with no success, and are not likely to, as their claims, if allowed, would give them a practical monopoly of the sewing machine business, because no machine could be made, which would now be used, without infringing their rights, if their patent was extended. There has been so much complaint about sewing machine extensions that every Congress so far has refused this one.

The report of the Librarian of Congress has just been sent in, from which it appears that the additions to the law department number 3,881 volumes, and to the miscellaneous department 17,656 volumes, besides 11,689 pamphlets and 2,344 maps and charts. This swells the aggregate contents of the library to 352,655 volumes and about 120,000 pamphlets. The copyright fees received and paid into the Treasury for the past year amounted to \$13,134.50. The Joint Committee on the Library, at a recent meeting, gave authority to Senator Howe and Representative Cox to prepare and submit to their respective houses bills providing for the erection of a National Library building, but leaving the designation of the site to be inserted in each bill according to their respective individual views. By this action the Committee propose to leave the controversy as to the location to be settled by Congress, without attempting to harmonize the conflicting views held by the different members of the Committee.

Those of your readers who are interested in the non-employment of Chinese laborers, may be happy to know that the House Committee on Education and Labor has authorized Representative Willis to report a bill prohibiting the bringing of any more than ten Chinese in any vessel to any port of the United States, under a penalty of \$100 and six months' imprisonment for every Chinese in excess of ten. The act if passed is to go into effect on July 1 next.

#### THE SUGAR QUESTION.

The Ways and Means Committee, after having listened for nearly a week to the leading men in the sugar trade, including merchants and refiners, came to the conclusion to report an amendment of the tariff, as follows: All imported sugars of the grade of 13 and under to be rated by the Dutch standard and pay a duty of 2.40. It now pays 2.19 for grade 7 and under, 2.50 for grade 10 and under, and 2.81 for grade 13 and under. This is all "refiners' sugar." On sugar between 13 and not over 16 the rate is to be 2.75 instead of 3.45, as at present. This is "grocery sugar," and can be used without refining. On sugar over 16, or refined sugar, the tariff is to be 4.00. The alleged coloring frauds being confined to sugars below 13, the adoption of a uniform rate for lower grade sugars leaves no incentive for coloring

#### PATENT AFFAIRS.

The business of the Patent Office during the year just closed shows a slight decrease, as will be seen on comparing the issues for the past two years, which are as follows:

Patents.	Reissues.	Designs.	Trade Marks.	Labels.
1877 . . . . 13,120	568	699	1,216	392
1878 . . . . 12,345	509	590	455	492
Decrease, 775	59	109	761 Inc.	100

This shows a decrease in all the issues except labels, which exhibits an increase of 100. The difference in the real amount of business done is not so great as at first appears from the above, as instead of 52 as usual there are only 51 weekly issues included in the above list, owing to the change in the system of dating and issuing patents that was made at the close of the year. Had there been no change in the system of dating patents there would have been 53 issues in 1878, as there were that number of Tuesdays in the year, and this would have brought up the number of patents to nearly the same as in the previous year.

The applications for patents, including designs, were 20,260, against 20,308 in 1877; of reissues, 638; caveats, 2,755; trade marks, 1,577; labels, 700; and there were 832 cases forfeited for want of the final fee. These numbers nearly equal the corresponding figures in the year 1877.

The financial figures show a very large increase in the amount to be transferred to the Treasury. The receipts from all sources being \$725,375.55, and the expenditures \$566,916.39, leaving a balance of \$158,459.16, which, added to the amount in the Treasury at the close of the previous year, leaves the immense sum of \$1,272,680.56 now in the Treasury to the credit of the Patent Office. And yet our legislators are all the time scrimping and screwing down the appropriations for the Patent Office, until there is not sufficient money allowed to pay the proper number of men to do the current work of the office promptly, to say nothing of reproducing the old drawings, a work of great necessity, and from which the office would derive a revenue that would soon repay the present outlay.

The burnt model rooms are still covered only by a temporary roof, which leaks at every storm, and there are no signs of any attempts to change this condition of things, although nearly sixteen months have elapsed since the fire, and there are over a million and a quarter of dollars of Patent Office money lying idle in the Treasury. The office is very much cramped for space in consequence, and much of the work of the office has to be done in rooms not fit for use. The models are crowded in the cases so much that proper examinations of them cannot be made, and the very object of furnishing models is thus defeated. In view of this, it is to be hoped that our Solons will endeavor to look on the Patent Office with more favor, and allow the Commissioner at least enough of the Patent Office funds to conduct the business of the office, and that they will settle upon some mode of putting the Patent Office in fit condition for use.

It seems, however, almost hopeless to expect any better treatment from Congress, judging from the way they are now engaged in amending (?) the patent laws. It appears from the present signs that the bill now before Congress will pass with its obnoxious sections substantially as originally drawn by the lawyers of the great railroad and manufacturing corporations, for whose benefit it was originated, and whose agents have been sent here at a heavy expense to lobby it through. There are, it is true, some good points added to sugar-coat the pills, but the coating is entirely "too thin" to overcome the effects of the other noxious elements. The inventors of the country, and all who are interested in the progress of invention, should immediately see to it that Congress is thoroughly informed as to the evil workings of the bill, should it be passed in its present shape, or there is but little doubt that it will pass and thus work incalculable mischief.

#### Who Made the First Steel Pens?

To the Editor of the Scientific American:

The letter of Mr. G. A. Loomis, in the SCIENTIFIC AMERICAN of November 23, 1878, with regard to the early manufacture of metal pens, reminds me of the following note which appeared in the Boston *Mechanic* for August, 1835:

"The inventor of steel pens," says the *Journal of Commerce*, "is an American, and a well known resident of our city (N. Y.), Mr. Peregrine Williamson. In the year 1800, Mr. W., then a working jeweler at Baltimore, while attending an evening school, finding some difficulty in making a quill pen to suit him, made one of steel. It did not work well, however, for want of flexibility. After a while he made an additional slit on each side of the main one, and the pens were so much approved that Mr. W. was called to make them in such numbers as to eventually occupy his whole time and that of a journeyman. At first the business was very profitable, and enabled Mr. W. to realize for the labor of himself and journeyman a clear profit of \$600 per month. The English soon borrowed this invention, and some who first engaged in the business realized immense fortunes."

HENRY G. CHANDLER.

Concord, N. H.

**ANEROID BAROMETERS.**—The Giffard Captive Balloon, at Paris, has, it seems, been made to serve for some interesting experiments with aneroid barometers. It was discovered that all, or nearly all, the barometers, after registering the ascent, failed to record the difference in altitude until some time after they had been returned to the earth.

**Vital Knowledge.**

In a strong and feeling article on the distress among the laboring classes in England, and the urgent need of the most liberal contributions from the wealthy to relieve the suffering of the masses, the London *Times* lays great stress upon a principle of education too often overlooked by public teachers. "The education of the laboring classes has been terribly deficient in this most important respect, that the schools for their children, of whatever denomination, have scarcely made any endeavor to teach the principles of conduct, or to make the pupils understand, as matters of familiar knowledge, the inevitable effects of industry and of idleness. Reading and writing are, no doubt, important, notwithstanding how greatly their value depends upon the quality of the compositions which are read or written; but it is not less important, to any man whose probable future is that of a recipient of weekly wages, that he should know thoroughly the immutable truth, which no combination can falsify, of the general dependence of prosperity upon industry, upon thrift, and upon the use of opportunities. When we hear of working men, even now, refusing a wage upon which they might live, and which is all that the state of the markets will allow their employers to pay, because it falls below some arbitrary or ideal standard, it is almost as natural to feel anger at their perverseness as compassion for their stupidity. The question, 'Have they been taught better?' is one which should be answered before any judgment is pronounced upon the case. Unless this question can be answered in the affirmative, the ignorance which has been permitted to continue is hardly a ground for denial of help to the sufferers. The capitalized wealth of the country is not insufficient to bear the strain beneath which the active prosecution of industry has for a time succumbed."

**New Agricultural Inventions.**

Mr. James E. Wells, of Holmdel, N. J., has patented an improved Apparatus for Destroying Insects on Vines. It is particularly intended for applying to potato vines a mixture of Paris green and water for the purpose of destroying the Colorado beetle or potato bug.

Mr. John H. Simpson, of Stone Bluffs, Ind., has patented an improvement in the implement commonly known as the "A-Harrow," being formed of two diagonal tooth carrying bars connected by a transverse bar. The improvement consists in a novel method of connecting the several bars.

Mr. Alphonso Record, of Farmington, Minn., has devised an improved Seed Planter, in which the holes of the dropping wheel will be so long within the seed box that the said holes will certainly become filled with seed before they come over the discharge holes.

An improvement in Cotton Seed Planters has been patented by Mr. Henry A. Walker, of Milton, N. C. This invention relates to machines for planting cotton and other seed. The construction and arrangement of the parts of the apparatus cannot be explained without an engraving. The machine is substantial and effective.

**A Large Contract for Iron.**

The Phoenix Iron Company, of Pennsylvania, have completed a contract with the Metropolitan Elevated Railroad Company, of this city, for 80,000,000 pounds of iron girders, columns, braces, etc. which the Philadelphia *Ledger* estimates will cost \$3,000,000.

One of the new roads of this company is to run on the Eighth and Ninth avenues to the Harlem river, a distance of four miles. The other branch will commence on Morris street, and along this street to Broadway, crossing that street at Bowling Green Park, through which it crosses to Beaver street, and thence to Pearl street, where it will connect with the present New York Elevated Railroad, and follow that to the upper end of Chatham Square; the new road will then branch off, passing up Division street to Allen, thence to First avenue, thence to Twenty-third street, thence to Second avenue, and thence to the Harlem river, making the distance seven miles. Most of the road is to be constructed so as to eventually receive four tracks, the cross girders to carry these tracks being 40 feet in length.

In putting this road up, it will be placed in the center of all streets over 55 feet in width from curb to curb, leaving space for carriages on each side, and with space underneath the elevated track for a double track street railway. Where the street is less than 55 feet between curbs, the columns will be placed on the edge of the sidewalk, and the girders will span the street, leaving the roadway unobstructed.

The Phoenix Iron Company, to complete these contracts, will keep their works in operation night and day. At present they have upon the pay roll 1,500 men, but in a few weeks this force will be increased to 2,000—a very encouraging state of things for the able-bodied men seeking work in those parts.

The shops and mills belonging to this company cover about six acres, in addition to the finishing shop, occupying a space of two acres more. There are twenty-one double puddling furnaces, and a contract has just been entered into for a mill containing eleven more, which, combined, will give a capacity of 800 tons per week of such iron as is used in constructing the elevated road.

During the time necessary to complete the work at the

mills at least 60,000 tons of coal will be required. To facilitate the operations at night in the machine shop two of Brush's electric lighting machines are to be introduced.

**A NOVEL OILER.**

Nothing in mechanics demands more attention than the subject of the lubrication of journals. There are many lubricants, and numerous devices for applying them, but there are few of either that are not in some respect deficient. In the lubrication of machinery it is essential not only to do it thoroughly, but in these days of economy it must be accomplished with due regard to cost.

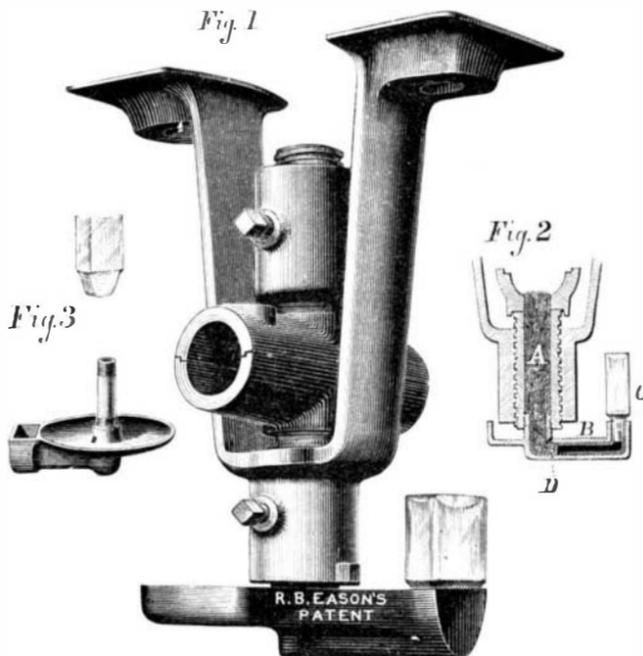
One of the most ingenious and apparently effective devices for continuously lubricating journals is shown in the accompanying engraving. In the arrangement shown in Figs. 1 and 2 the lower trunnion of the journal box is tubular, and has a filling, A, of cotton waste or other fibrous material, as shown in Fig. 2. Into the trunnion is screwed the nipple which supports the drip pan, B, and the passage formed in the bottom of the pan communicates with the nipple and has a vertical opening for receiving the neck of the bottle, C.

The nipple, which extends into the trunnion, is filled with cotton waste, so that when it is screwed into place the wick is practically continuous from the horizontal passage in the pan to the journal.

A small hole at D permits the oil that drips from the journal into the pan to re enter the wick tube and be again used.

In Fig. 3 is shown an oiler and drip pan adapted to an ordinary journal box. Its principle is precisely the same as in the one just described.

The bottle, C, is filled with oil, and inverted, and its neck is inserted in the mouth of the passage in the pan. As long as the horizontal passage in the pan is full the oil will not escape from the bottle, but when it is drawn by the capillarity of the wick so that the mouth of the bottle is exposed, a small quantity of air enters and a drop or so of oil escapes.



**EASON'S DRIP-PAN AND OILER.**

By means of this device oil is supplied to the journal just when it is needed, and every particle of oil is utilized. We are informed that this device has proved very efficient in practical use.

Further information may be obtained from the patentee, Mr. R. B. Eason, 135th street, between Alexander and Willis avenues, New York city.

**Killed by Snakes and Wild Beasts.**

The *Lancet* says that in the report on "Sanitary Measures in India," which has just been presented to Parliament, it appears that last year 21,682 fatal cases from attacks of wild animals had occurred in ten provinces, the largest number being in Bengal, namely, 10,062. The deaths from snake bites alone in the Punjab last year were 828, against 979 in the preceding year. As showing the rapidly fatal effects from the bite of the cobra, the commonest and most deadly of Indian poisonous snakes, Surgeon A. J. Wall states that one night, about half past twelve o'clock, a Hindoo punkacooly, aged forty, while sleeping in the veranda of the doctor's house was bitten on the shoulder by a snake about three feet long. The noise and confusion soon awoke Mr. Wall, who at once hastened to the assistance of his servant, and after waiting for a short time for some ammonia, he proceeded to inject it, as recommended by Sir Joseph Fayrer and Professor Halford, previously giving the patient plenty of brandy, walking him rapidly about, etc.; yet, notwithstanding all attention, the man died in sixty-five minutes after the attack. Mr. Wall adds that the remedy had as little effect on the symptoms as it had on the result.

**Rest for Headaches.**

Dr. Day says, in a late lecture: Whatever be the plan of treatment decided upon, rest is the first principle to inculcate in every severe headache. Rest, which the busy man and the anxious mother cannot obtain so long as they can manage to keep about, is one of the first remedies for every head-

ache, and we should never cease to enforce it. The brain, when excited, as much needs quiet and repose as a fractured limb or an inflamed eye, and it is obvious that the chances of shortening the seizure and arresting the pain will depend on our power to have this carried out effectually. It is a practical lesson to be kept steadily in view, in that there may lurk behind a simple headache some lesion of unknown magnitude which may remain stationary if quietude can be maintained.

There is a point worth attending to in the treatment of all headaches. See that the head is elevated at night, and the pillow hard; for, if it be soft, the head sinks into it and becomes hot, which with some people is enough to provoke an attack in the morning if sleep has been long and heavy.

**Petroleum in Formosa.**

Two Pennsylvania gentlemen have returned from China, whither they were about a year ago to examine, for the Chinese Government, the oil grounds of the Island of Formosa. They report that a well was drilled through soapstone 396 feet; then 136 feet of drill pipe were put in and 265 feet of casing. No more casing could be got in owing to the caving in of the rock. At 348 feet depth a large vein of salt water was struck, and it was found impossible to go more than 48 feet deeper. Fifty barrels of oil were pumped in ten days. The oil territory is unlike anything found in Pennsylvania. The oil is very light in color and gravity, and was burned in lamps without refining. The property belongs to the Chinese Government.

**A New Mode of Locomotion.**

The newspaper carrier who serves papers to the attendants in the Permanent Exhibition Building goes his rounds at the rate of 12 miles an hour. He travels on machines not unlike roller skates, which are called pedomotors, according to the inventor, Mr. J. H. Hobb, an architect on Walnut street, above Fifth. The day is not far distant, predicts the Philadelphia *Record*, when the whole city will be on wheels, when pedestrians will be skimming through the streets at the rate of 10 miles an hour, without more effort than is now put forth in perambulating half that distance.

The pedomotor consists of four tough, light, wooden wheels, supplied with an outer rim of tough India-rubber. These wheels are secured to a frame the shape of the foot, which is strapped to the pedal extremities in the usual manner. Unlike roller skates, the wheels of these little vehicles are not under, but are placed on each side of the foot, thus giving the wearer a good standing, as well as a solid footing. The rear wheels are 3 inches in diameter, while those in front are but 2½ inches. This gives the foot a slight incline, and when in motion has much to do in impelling the pedestrian forward. Extending from the toe, with a slight curl toward the ground, is a piece of casting termed the pusher, which is simply used in mounting an elevation or steep incline. From the center of the heel a small brass wheel extends backward, serving as a guide as well as a brake. The whole scarcely turns the scale at a pound weight. In using them no more effort is required than in ordinary walking. The wearer steps with his regular stride, and is amazed to find himself skimming over the ground so rapidly with so little muscular effort. Mr. Hobbs explains the mystery of the rapid

movement in this manner: A man whose stride is 32 inches will traverse 48 inches, or one half further, with the pedomotor. This is because the body is in constant motion. For instance, says he, the traveler starts, and while he raises one foot to step, he continues rapidly onward until that foot is set down and the other raised to make another step. This gives him more momentum, and away he goes over the two miles in the same time to accomplish a mile with the feet. No effort of the body is required for their use, as in skates. The traveler simply puts one foot before the other, and finds himself whizzed along at a lively rate.

**Horseshoes for Slippery Streets.**

Why may we not adopt the means practiced in Germany of inserting temporary calks in horseshoes during the slippery season? The German smith, when finishing the shoe, punches a hole in the two ends, and when the shoe is cold he taps in a screw thread and screws into the shoe, when on the horse's foot, a sharp pointed stud of an inch in length; and with shoes thus fitted the horse can travel securely over the worst possible road, and I have never known one to slip either when riding or driving; and draught horses are shod in the same way. When the horse comes to stable the groom unscrews the pointed stud and screws in a button, so that no damage can happen to the horse, and the screw holes are prevented from filling. When the horse is going out the groom simply takes out the button and screws in the pointed stud, thus preventing strained sinews, and the public are spared the painful sight of horses down or slipping in all directions.

We believe that a patent was granted for substantially the above described German mode of attaching calks to horseshoes, but we have never known of its being adopted. Certainly if it is feasible to use such removable calks in Germany, and we are told they are in general use, then we know no reason why they are not equally adapted to our slippery streets.