Scientific American.

ESTABLISHED 1845

MUNN & CO., - - - EDITORS AND PROPRIETORS.

PUBLISHED WEEKLY AT

No. 361 BROADWAY, - - NEW YORK.

TERMS TO SUBSCRIBERS

One copy, one year, for the United States, Canada, or Mexico $3.00
One copy, one year, to any foreign country, postage prepaid. £0 16s. 5d. 4.00

THE SCIENTIFIC AMERICAN PUBLICATIONS.

Scientific American (Established 1845)..... .....$3.00 a year
Scientific American Supplement (Established 1876) ..... 5.00 "
Scientific American Building Edition (Established 1885). .... 2.50 "
Scientific American Export Edition (Established 1878) ..... 3.00 "

The combined subscription rates and rates to foreign countries will be furnished upon application.
Remit by postal or express money order, or by bank draft or check.
MUNN & CO., 361 Broadway, corner Franklin Street, New York.

NEW YORK, SATURDAY, JULY 20, 1901.

The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are *sharp*, the articles *short*, and the facts *authentic*, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

A NEW SCHEME OF TRADE MARK BLACKMAIL.

An extraordinary and unusual form of enterprise has recently developed in Cuba owing to the fact that the old Spanish practice as regards Trade Mark registration still exists in that island. In Cuba, as in most of the Spanish-speaking countries, the first registrant of a trade mark becomes the legitimate owner in the eyes of the law, even though he may have appropriated the name or mark from some other source. In the United States it is well known that the rightful owner of a trade mark must be the first originator of the mark, while in most foreign countries the ownership of said mark depends upon the formal act of registration alone and the question as to who is the first originator of the mark is not inquired into. It is possible, however, for merchants who have registered their trade marks in the United States to extend their rights over the foreign possessions of the United States, including Cuba, by simply registering in those countries certified copies of the United States certificate and complying with other formalities, and this may be done for a trifling fee. It is astonishing, however, how very lax our manufacturers and merchants are in regard to this matter and what penalties they have to pay for their ignorance or neglect. It appears that there is in Cuba a small gang of clever "gentlemen" who have determined to profit by the carelessness of American merchants and who make it a practice to register such marks as they think are likely to be extensively used in trade in that country. Several instances have recently come to our notice in which an ounce of prevention would have saved a world of trouble and annoyance. The American merchant has no redress, and when he places his goods on the Cuban market he is politely informed that he is infringing Mr. John Doe's trade mark and is notified to discontinue. He is naturally half amused and nonplussed at Mr. Doe's temerity, but when the Cuban Certificate of Registration is produced showing a facsimile of his mark, the serious nature of his position begins to dawn upon him. What is to be done? He has been guilty of laches and must pay the penalty.

A firm of wholesale drug merchants registered in this country several years ago a trade mark on a particular drug, which has since attained an enormous popularity. No registration was made, however, in the colonial possessions, and one of these "gentlemen" in Cuba, above referred to, foreseeing that this drug would have a large sale in that country, applied for registration of the trade mark under his own name. Before his application was granted, however, the firm in question had applied for registration of its mark, but the application was refused on the ground of anticipation and the registration was granted to the first applicant. As a sequel to this, the firm has been obliged to buy out the successful applicant, paying something between eight hundred and a thousand dollars for the certificate thus fraudulently obtained.

We have repeatedly pointed out in these columns the necessity of attending to these formal details which are so important in protecting trade rights in most foreign countries, and the foreign commerce of the United States is becoming so extensive that these matters should not be neglected or forgotten. We are happy to say that many of the great commercial houses are fully awake to the importance of protecting their interests in this matter, and the danger of neglect is being happily more and more understood.

THE STRUGGLE OF THE CUP CHAMPIONS.

The races which have already been sailed between the "Columbia," the "Constitution" and the "Independence" have given a very clear line on the respective merits of the yachts. As far as the two Herreshoff boats are concerned (the "Independence," unfortunately, being at the present writing not a candidate for cup defending honors), the New York Yacht Club is confronted by a dilemma, which must forcibly remind it of the earlier contests for the "America cup," when the club was accustomed to bring a whole fleet of its yachts to the starting line, and select that yacht which was best suited to the particular kind of weather which was encountered on the morning of the race. For it is a fact that the races thus far sailed between the old champion, "Columbia," and the new boat, "Constitution," have shown that in light winds of from four to five knots strength the "Constitution" is unquestionably superior, while in winds of from seven or eight knots strength and upward the "Columbia" is the faster vessel. In the first race between the two boats, sailed in a good topsail breeze, the "Columbia" beat the "Constitution" by 2 minutes and 10 seconds over a windward and leeward course of 30 miles. In the next race "Constitution" turned the tables by beating "Columbia" by 9 minutes and 49 seconds in a five-knot breeze over a similar course. Then, in a still lighter and very fluky wind, she beat "Columbia" over a triangular course of 30 miles by 29 minutes and 35 seconds. Three days later, in a seven to ten knot breeze, and over a windward and leeward course of 30 miles, "Columbia" wins by 4 minutes and 35 seconds; and on the following day she wins her third race from "Constitution," this time in a strong breeze and over a triangular course, by 1 minute and 40 seconds. Judging from these races it must be admitted that, in the average winds that are encountered over the Sandy Hook course during the month of September, the "Columbia" seems to be a more likely defender than the "Constitution" in her present form. It must be remembered, however, that there are yet two months of tuning-up in store for the new boat, and it is quite possible that the experience which will be gained in the many races and informal trials which she will pass through may bring her up to the point at which she can defeat "Columbia" in any kind of weather.

In the first two races of the Newport series the conditions of wind and sea were the worst possible for a yacht with the flat floor and long overhangs which characterize the "Independence"; and she practically did not figure in the finish of these two trials. In the third race, however, the sea was smoother and the wind had more heart in it, with the result that she turned the outer mark ahead of the "Constitution" and was only beaten 2 minutes and 15 seconds by that yacht over the whole course. In the fourth race she had the misfortune to carry away her topmast, and thus lost the opportunity to show what she could accomplish under the conditions which are supposed to be most favorable for a yacht of her kind. The performance of the "Independence" in the last races shows that she may yet prove herself to be a match for the Herreshoff boats in a strong and steady wind, and on any occasion when the three yachts may meet during the coming season there will be the liveliest kind of interest in the result.

Concurrently with the defeat of the new American Cup defender by the old champion comes the information that, in the course of the sailing trials which are now taking place between the two "Shamrocks," the new boat is beginning to show a decided superiority over the old one, her best performance being a gain of five minutes over "Shamrock I." during a thrash to windward of seven miles in a good topsail breeze. She now seems to be unmistakably superior to windward and a trifle faster down the wind. The significance of these trials depends, of course, upon the question as to whether "Shamrock I." is sailing faster or slower than when she met "Columbia" off Sandy Hook. We are informed by those who are connected with "Shamrock" that her mast has been stepped two feet further forward than it was during the last Cup contests, and that changes have been made in her keel, both modifications having in view the improvement of her windward qualities. As the result of these changes, and the admittedly excellent work which "Shamrock I." has been doing this year, she is estimated to be from 5 to 10 minutes faster over a 30-mile course than she was two years ago. As this is about the time by which she was beaten by "Columbia," it would look as though the new "Shamrock" were going to prove a very active competitor for the Cup. Until "Constitution" has shown her undoubted superiority to "Columbia" under any possible conditions of weather, it is probable that not even the New York Yacht Club itself will look upon the America Cup as being, in the current phraseology of the day, "safe." It is probable, however, that as the season advances there will be a steady improvement in the new yacht, and that when the final Cup trials are sailed she will prove to be a winner by margins which will depend merely upon the weather conditions under which the course is sailed.

A NAVAL PROBLEM.

The rapid growth of our navy has naturally created many new problems, which the Department has solved with more or less success; but probably the most pressing question for solution in the immediate future is that of obtaining a sufficient number of commissioned officers to command the new ships building. The need for more officers of high standing was never so apparent, and no relief can come from Congress until next winter. Thirty-five vessels of the torpedo-boat and torpedo-boat destroyer types will be ready to be placed in commission this summer, and there are practically no officers available to command them. Secretary Long has the power to make use of officers of the navy on the retired list, but very few of these are serviceable for active duties, and little relief can be expected from that quarter. The attempt to put young naval cadets in command of costly and delicate torpedo-boats might produce serious results. Yet to lay these new boats aside until Congress finds the time and pleasure to provide adequate officers for them means vexatious interference with the navy's contemplated plan of establishing a coast service of torpedo-boat stations.

Before the end of the summer the navy will have a numerous torpedo flotilla, and the board of officers appointed to decide upon a scheme of coast protection with boats of this class has practically determined upon establishing a series of torpedo-boat stations extending from Portland, Me., to Pensacola, Fla. The three main stations will first be established at New London, Conn., Port Royal, S. C., and Pensacola, Fla., with sub-stations between these points. These sub-stations would be selected for the purpose of affording the torpedo-boats good harbors from which they could operate. But until Congress makes definite provision for increasing the commissioned personnel of the navy commensurate with its expansion in ships, it will be impossible to carry these plans into action.

Even the summer course of study at the War College at Newport and at the torpedo stations will be seriously handicapped this season by the lack of officers. The War College and summer course of instruction opened in June, and the need of instructing more officers in the handling of torpedoes and in electricity is urgently felt. This summer at the torpedo stations the officers will be given, moreover, a thorough course in the principles of wireless telegraphy. The rapid improvement in wireless telegraphy, and its adoption by several of the European countries on their naval ships, makes it advisable that our officers should become thoroughly familiar with the system. The summer experiments with torpedoes and torpedo-craft have always been among the most interesting and instructive that the navy has undertaken, and the coming summer maneuvers would prove of special importance because of the larger flotilla ready for service, provided sufficient commissioned officers could be mustered into the service to command the new vessels.

The construction of all types of war ships now in the course of building has progressed so far that the need of more officers will steadily increase during the next year. The sixteen torpedo-boat destroyers are all more than 50 per cent completed, and the majority are nearly ready for their final trial, while eleven of the fourteen torpedo-boats are practically ready to be placed in commission. The seven submarine torpedo boats are also progressing. Of the battleships building, the "Illinois" is 92 per cent completed, the "Maine" 50 per cent, the "Ohio" 42 per cent, and the "Missouri" 32 per cent. The new protected cruisers are also being rapidly completed, with the "Denver" about 45 per cent, the "Chattanooga" 29 per cent, the "Des Moines" 28 per cent, the "Galveston" 22 per cent, and the "Tacoma" 18 per cent completed. Most of the new monitors are more than half finished. The "Nevada" is 86 per cent completed, the "Wyoming" 73 per cent, the "Florida" 65 per cent, and the "Arkansas" 54 per cent. The armored cruisers "Pennsylvania," "West Virginia," "California," "Colorado," "Maryland," and "South Dakota," with a speed of twenty-two knots, have not yet been begun. Neither have the new battleships, the "Virginia," "Nebraska," "Georgia," "New Jersey," and "Rhode Island," nor the recently authorized protected cruisers "St. Louis," "Milwaukee," and "Charleston." Nevertheless, there is a sufficient fleet of new ships soon to be commissioned to make the demand upon the Department for more officers so great that relief must come from some quarter before long. This problem handicaps the Navy Department to-day quite seriously, and even threatens the efficiency of the Naval Academy. The superintendent of this institution has complained of the lack of sufficient officers for duty there to supervise the drills, technical instruction, and general discipline of the cadets, and the Navy Department has recognized the justness of the complaint; but it is unable to afford much relief. Thus it is that Congress must at its reassembling in the fall make provision for more officers if it expects to reap the full rewards of its recent movement to extend the power and usefulness of the United States navy. While crews for new vessels may soon be recruited from practically raw material, competent officers cannot be manufactured in a few months, but must be educated and trained through a series of years.

Likewise the need of more well trained engineers and officers in the engine-room is pressing hard for solution. The present situation in this respect is so

critical that the ultimate results on the navy may prove disastrous if some relief is not soon afforded. The old talk of regenerating the old Engineer Corps distinct from the line is now revived. This would mean the re-establishment of a corps of officers who would have no other duties than those of the engine-room. Examinations are now being held, in the Philippine Islands and at all the principal naval stations, of enlisted machinists for the rank of warrant machinists, and fifty of the two hundred applicants will be immediately appointed. In this competitive examination some good men will be brought forward, and it is believed in some quarters that these fifty appointees may become the nucleus of the new Engineer Corps.

DEFECTIVE ASSIGNMENTS OF PATENTS AND ROYALTIES.

In the transfer of property from one holder to another, certain forms of law must be observed for the protection of both parties. In the case of real estate or any merchandise whatever, conveyances may be properly drawn by attorneys familiar with the usual forms, but if a transfer of patent rights is to be made to an incorporated company, involving the allotment of shares, rights to make and vend upon royalty, the proceedings must accord with the laws of the State in which the company has been incorporated, and a thorough knowledge of corporation law is indispensable to the attorneys; otherwise, when the company attempts to transact the business for which it was organized, it will find itself unable to do so legally. Example: in some States shares cannot be assigned in payment for services rendered or for merchandise, but this has been done; consequently there has been an illegal issue of stock, and if litigation ensues at any time in the transactions of the company it may prove a bar to recovery. If an inventor finds that his company has not been properly organized, all proceedings are irregular until the work of organization has been done over, causing great delay and extra expense.

A case of this kind recently occurred in a nearby State. John Doe, the inventor of a staple article which is in great demand, and has involved a large investment of captital, had manufactured the goods upon a small scale, but finding his business growing beyond his facilities, applied to a firm of brokers to increase his capital. To do this they required him to have the company incorporated, having, of course, previously investigated the proposition as an investment. The company was incorporated, the work having been done by a lawyer who asserted that he was familiar with the procedure, and had started several companies upon the road to success. A directory was elected and regular meetings held to take over the property of John Doe, after which it devolved upon the brokers to arrange for the issue of full-paid, non-assessable shares at certain prices, and both parties awaited results. John Doe, as the owner of the patents, was to receive a certain sum for them from the sales of stock made by the brokers, the company itself advancing no cash in the first instance to secure the property to itself, and the rights of John Doe in the patents were not to be transferred until he had received the money for them. This was thought to be an equitable arrangement for both parties, but in the light of better legal advice it was seen that there had been no transaction whatever. The company, although ostensibly ready to do business, had nothing to do it with, for the company did not own anything, having actually bought nothing, and certainly could not issue, transfer or sell what it did not own; the shares allotted to be sold by the brokers or guaranteed by them, were not merchandise or lawful tender, because no one owned them. All the proceedings, therefore, were null and void, and the work had to be done over upon proper methods. Fortunately for John Doe no irregular proceedings affecting the status of the company had been taken, but delay was caused by the incompetency of the attorney, himself a resident of the State where the company was incorporated.

In the granting of licenses to make and vend, it is necessary for inventors to be very careful in selecting attorneys to draw up the papers; in no case should so-called "mutual agreements" be entered into, as between man and man, relying solely upon the assumed good faith and intention "to do what is right," as it is often termed, by both parties; the covenants should be clearly and definitely set forth. Papers or agreements which are drawn up in apparently legal phrases are sometimes wholly contradictory and adverse to both parties. One such "agreement" was drawn by parties of the first part in which a certain commission was to be paid them for the performance of certain work; but who was to pay the commission, when and where it was to be paid, was not stated. An example of the difficulties persons are liable to meet with from defective licenses is shown in the experience of Richard Roe; he had invented a certain device which was a great improvement upon a similar one then on the market and made by an old established house. The inventor went to these people, who, after examining his device, said it was better than theirs, and they would like to make it on royalty. Papers were drawn up in which they agreed to pay a certain small bonus, and thereafter a minimum amount yearly, after the manufacture had begun. The bonus was paid and the inventor at the end of a year applied to the licensees for the minimum yearly amount, having heard nothing whatever from the parties in the interim. When he asked for an accounting for the past year, no one seemed to know anything about the matter, but persistent inquiry revealed the fact that the matter had not yet been acted upon; or, in other words, the firm had simply locked the proposition up in their safe, and had no intention of ever putting the article on the market. It would have spoiled the sale of the goods they had made for years, and required a new outfit to get it up, so it was simply shelved. If the inventor had had a proper agreement, he could have instituted suit, at least, but he had put himself out of court by an agreement that gave him no recourse.

As a rule inventors are not business men; also, as a rule, they are prone to think that any paper or writing stating certain facts in legal verbiage is ample protection against trespass, but they are seriously mistaken, and cannot be too careful in parting with their rights.

INTRODUCING AMERICAN METHODS IN ENGLAND.

The immense workshop that the British branch of the Westinghouse Engineering and Manufacturing Company are having erected at Manchester is rapidly approaching completion. When in working order it will be a busy hive of British industry, giving employment to some 6,000 people. Americans will control the business for the first few months, and will then be succeeded by English engineers who at present are being initiated into American business methods at Pittsburg. The works cover 40 acres of ground and are divided into seven departments. The machine shop covers eight acres. From the north end of this shop to the south end of the power house there is a single stretch of roof 1,135 feet in length by 427 feet in width. The steel and iron foundries each cover nearly six acres; while the brass and malleable iron foundries each cover approximately four acres. There is also a fine six-story block of offices with a frontage of 250 feet. The building contains 15,000 tons of steelwork, which has cost $90 a ton, and 9,000,000 feet of timber. The electricity will at first be generated by steam power, but this will be subsequently supplanted by gas engines. All through the grounds culverts are laid for the cables for the transmission of power throughout the various departments. The buildings alone are costing $4,500,000, and the plant to be installed will represent another $2,000,000. The location of the factory is ideal. It stands on the bank of the Manchester Ship Canal, so that vessels can proceed up to the very doors of the factory, which will result in great economy in handling the goods, while the Bridgewater Canal, which also runs alongside, will enable coal to be purchased and delivered at the factory very cheaply; and it is also in close connection with the principal railroads of the country. When completed it will be one of the largest engineering factories in Great Britain.

MANUFACTURE OF CELLULOID BEADS.

In these articles German celluloid manufacturers, we read in the Gummi-Zeitung, are unable to compete with the makers in Gablonz, who would underquote them even if the former sold at cost price, and a few details which explain this are given. There is one firm in Gablonz employing about 30 hands, and the beads are not pressed, but each one is singly turned in the foot lathe. Ordinary living rooms serve as workshops, which are lighted by electricity. It must not be presumed that this is the result of progress; it is only a matter of convenience, as Gablonz, in electric lighting, is ahead of small towns in Germany. One room contains 20 to 25 lathes, surrounded by round celluloid rods. Another room holds 6 to 8 American quick-drilling machines, also worked by foot, and attended by 6 to 10 female hands. The rods are cut up with a circular saw, which is fixed on the lathe, to the size required, and a man can cut about 3,000 per hour. They are then drilled at the rate of two to six gross per hour, according to length. After this they are turned on the lathe, each bead being separately placed tightly on a pin. The turning tool is a sharp chisel, which leaves the surface of the bead quite smooth. The polishing is done by simply holding the beads in the fumes rising from a vessel containing boiling spirit. The wages paid are very low, turners earning $2.50 to $3.75, drillers $1.75 to $2.00, and girls $1.00 to $1.25 per week.

The Cathedral of Notre Dame at Paris, which has up to the present time been only lighted by candles, is about to be lighted by electricity.

SCIENCE NOTES.

The population of Paris has increased 6.98 per cent in the last five years. At the present time the total population is 2,714,068.

The Society of German Engineers in Berlin has undertaken the preparation of an international technical dictionary to be published in English, French and German. Its aim is to secure exhaustive completeness in technical words and expressions, exactness in translation, and uniformity in usage.

A curious phenomenon was observed at the village of Le Ghazil, in the French Alps, recently. One day toward evening the inhabitants were disturbed by a loud rumbling in the vicinity of Mont Farand, which increased in intensity. Looking toward the scene of the disturbance, the villagers were further startled by seeing bright flashes of fire. At first the unusual spectacle was attributed to volcanic agencies, and a party of civil engineers set out to examine the cause of the phenomenon. They discovered that the intense dry heat had caused the chalk rocks on the summit of the mountain to crack and to break away in all directions. These rocks had descended the mountain like an avalanche, and being thickly veined with silex, in descending they had struck one another with terrific force, scattering brilliant showers of sparks in all directions, with such rapidity that they resembled one single sheet of flame.

From the known latitude of a station it is possible to calculate the number of hours that the sun is above the horizon during a year. The observations at the various stations of the United States Weather Bureau give the actual number of sun-lit hours. A comparison of the two numbers gives the percentage of sun-lit hours at the station. From the last report of the bureau (just published) the following data are selected: Albany, N. Y., 55 per cent of sun-lit hours; Atlanta, Ga., 53 per cent; Atlantic City, N. J., 58 per cent; Baltimore, Md., 66 per cent; Boston, Mass., 52 per cent; Buffalo, N. Y., 54 per cent; Charleston, S. C., 55 per cent; Chicago, Ill., 53 per cent; Cincinnati, Ohio, 61 per cent; Cleveland, Ohio, 44 per cent; Denver, Colo., 71 per cent; Detroit, Mich., 50 per cent; Galveston, Tex., 61 per cent; Indianapolis, Ind., 49 per cent; Jacksonville, Fla., 67 per cent; Key West, Fla., 71 per cent; Los Angeles, Cal., 76 per cent; Minneapolis, Minn., 52 per cent; New Orleans, La., 49 per cent; New York, N. Y., 52 per cent; Phœnix, Ariz., 84 per cent; Philadelphia, Pa., 58 per cent; Rochester, N. Y., 41 per cent; St. Louis, Mo., 62 per cent; San Diego, Cal., 73 per cent; San Francisco, Cal., 71 per cent; Santa Fe, N. M., 75 per cent; Washington, D. C., 58 per cent.

Another attempt to ascertain the difference in the longitude between London and Paris is shortly to be made by the Greenwich and Paris observers, respectively. This will make the fourth occasion upon which these two observatories have endeavored to settle this point, but their results have always differed. At the beginning of the last century the difference in longitude was estimated by primitive methods to amount to 9 minutes 21½ seconds. When the electric telegraph came into use a determination by this means proved the calculation to be one second in excess. As time progressed various circumstances proved that even this estimation was fallacious, and in 1888 a determined attempt was made by two French astronomers at the Paris Observatory and two astronomers at the Greenwich Observatory, respectively, to ascertain the actual difference. Notwithstanding their working in conjunction, no final data was attained, for, whereas the French geodists calculated the difference to be 9 minutes 21 seconds and some few hundredths of a second, the Greenwich observation was a fifth of a second less. In 1892 another attempt was made on precisely similar lines, and again the English calculation was about one-fifth of a second less than the French result. It is anticipated that the progress of geodesy within the past nine years will enable the results of the two observations to coincide this time. It is imperative that their calculations should be the same, since nations often divide their territories, when no natural boundaries are possible, by longitude and latitude. For instance, the boundary line between South Australia and New South Wales is nominally by longitude 141 degrees east of Greenwich. Telegraphic calculations, however, prove this delimitation to be erroneous by several hundred feet, a result probably due to uncertainties in the determination of the longitude. Such inaccuracies, trifling though they may appear from an evanescent point of view, are of vital importance in discussions over the boundaries between different countries, and may possibly lead to serious results. For example, the exact delimitation of the boundary line between Canada and this country in Alaska, which is at present under discussion, depends upon the astronomical observations. It will thus be seen that if the English and French observers can succeed in their measurements, or ascertain the sources of error, they will have accomplished a valuable service.