

acid is conveyed by gravity about the building. Each bar is stamped with its fineness and weight, and these marks are accepted all over the world. Bars are of various sizes, those of a value of \$8,000 being preferred. Bars are made all sizes to accommodate even the small manufacturer, small bars of \$100 worth being made. Last year about \$14,000,000 were taken out for use in the arts. The deposits for the fiscal year ending June 30, 1900, had a value of \$56,296,096.15 for the gold and \$7,516,742.58 for the silver. The number of gold deposits melted was 8,581; of silver, 3,223, making a total of 11,804. The number of fine mint and standard bars made and delivered to the Superintendent was, of gold 40,616, and of silver 42,562.

One of our engravings represents bars of various sizes with the value stamped upon them. The smallest bar at the left is worth about \$105. Then the bars run up in size to \$8,000. Two silver bars are shown at the back. A "gold brick" has come into our language as the very epitome of fraud, and that they are a grim reality is shown by the four samples which were placed upon the truck. They are of all sizes and shapes to meet the varying fancy of their victims and are rarely of the shape of the Mint bars. Two of them would have been worth \$18,000 had they been actually of gold instead of base metal. Those who are in need of gold bricks should be willing to purchase them at the regular rates, and all sizes may be had at the Mint office. It might be said in closing that the Assay Office is open to visitors.

A NEW EQUATORIAL TELESCOPE FOR OXFORD.

BY OUR ENGLISH CORRESPONDENT.

At the Radcliffe Observatory, Oxford, England, a new 24-inch equatorial telescope is being erected. Although by no means the largest in the world, this instrument is replete with several new features and appliances, the result of recent experiments and investigations, so that it is one of the most modern combinations of the refinement of inventive skill and mechanical arrangements extant.

The telescope has been constructed entirely by the famous optical instrument manufacturer, Sir Howard Grubb, F. R. S., at the Rathmines Astronomical Works, Dublin, Ireland. Curious to relate, the designing and construction of large telescopes is now practically an Irish monopoly, since Sir Howard Grubb, who is now the greatest authority on this work, has built all the large telescopes worthy of mention in all parts of the world. It will be remembered that the Lick Observatory and telescope was erected mainly from his designs and it was the first observatory to be equipped with the mechanical rising floor, which has proved so successful that it was adopted in all the subsequent observatories.

The glass for the lens of the Oxford instrument was cast at the celebrated Mantois works in Paris, thence transported to Dublin in the rough, and there cut and ground to the requisite shape.

All the lenses for these huge telescopes are cast in Paris. The process employed by the Mantois firm in the manufacture of the glass as a jealously preserved secret. It was originally discovered by a Swiss mechanic, who divulged his secret to Mantois. The secret was afterward secured by an English lens-making firm, Messrs. Chance Brothers, of Birmingham. The latter firm, however, has never entered into competition with the Parisian manufacturers in the casting of telescopic lenses. Their work is entirely restricted to the manufacture of the prisms and lenses utilized in lighthouses, and they are the sole manufacturers of this specialty for the Trinity House Brethren, who control the lighthouses and light ships round the coasts of Great Britain. The Mantois firm cast the huge 40-inch object glass for the Yerkes instrument, and also those for the telescope at the last Paris Exhibition, which proved such a dismal failure.

The Radcliffe Observatory at Oxford, for which the new telescope has been designed, is one of the oldest in existence. It was founded about the year 1772 by the Radcliffe Trustees, after whom it is named, in response to a request by Dr. Hornsby, the Savilian Professor of Astronomy of that day. At that time it was probably the finest observatory in Europe, and was equipped with instruments by the famous maker, John Bird. About 1840 an important addition was made to the instrumental equipment in the great 7½-inch heliometer, which was

for many years the finest and largest instrument of its class in the world.

For some time past the necessity of a modern equatorial telescope has been experienced, and the new instrument has been installed, through the efforts of the Observer, Dr. Arthur Rambaut, F. R. S., formerly Astronomer Royal for Ireland.

The instrument consists of two telescopes combined—one for photographic observations of the heavens, and the other for direct visual work.

The photographic telescope contains a lens of 24



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inches diameter, and is 22 feet 6 inches in focal length. The direct visual telescope is of 18 inches aperture, and is of the same length as the 24-inch telescope. The necessity for two telescopes arises from two causes. In the first place, owing to the fact that light of different varieties is unequally refracted by the glass of which the lenses are composed, it follows that an object glass which is constructed to give the best possible image when viewed directly by the eye, will not bring those rays, which are chiefly active in forming the photographic image, to a perfect focus, and it is found necessary to use an object glass made especially with a view to receive these rays. In the second place, in order to obtain photographic pictures of the fainter objects, some of which, from the astronomer's standpoint, are just as important as the more conspicuous ones, it is necessary to submit the photographic plate to their feeble rays for a prolonged

period of several hours. In certain instances even the whole length of the winter's night is not sufficient to obtain a useful picture, and it is necessary to expose the plate for several nights in succession upon the same object. All the time that the star is being photographed it is moving across the sky, and consequently to obtain a sharp image it is of fundamental importance that the telescope should be kept pointing exactly at the particular star during the whole of the exposure. This is accomplished to a high degree of precision by means of very accurate clockwork. But

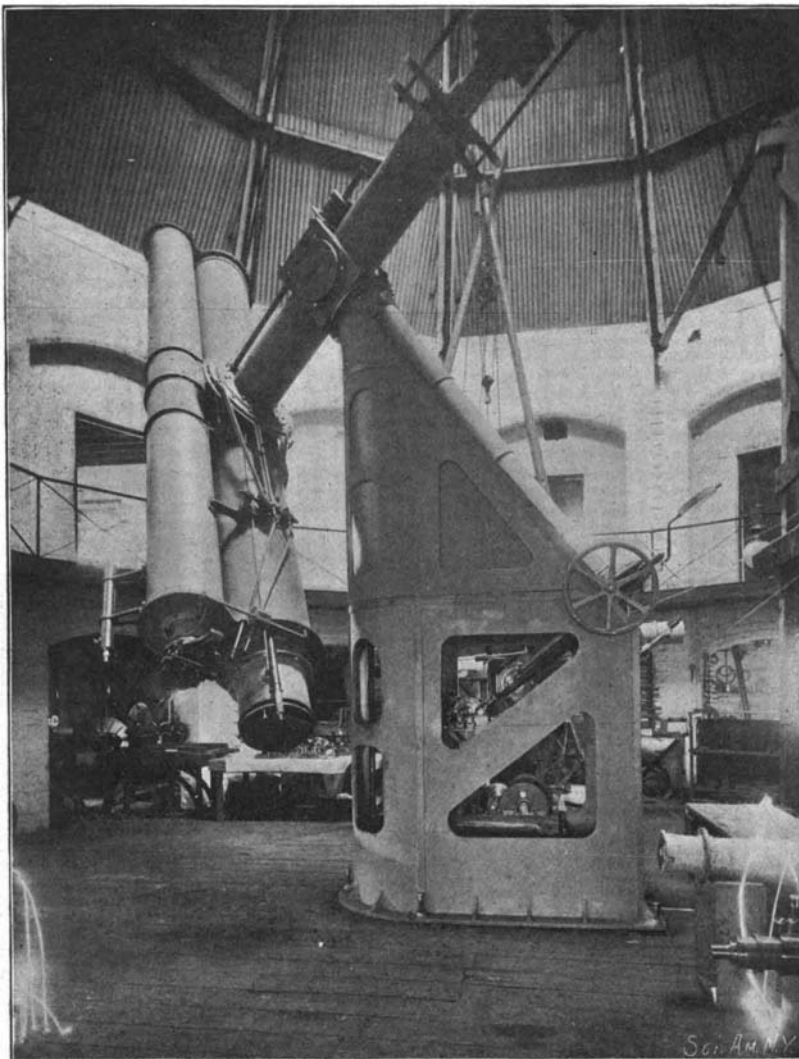
no mechanism with uniform motion made by human hands, can be made to move regularly with the accuracy which some branches of astronomy demand. The precision which has been attained in Sir Howard Grubb's newest form of electrically-controlled clock may be comprehended from the fact that exposures of half an hour's duration are sometimes taken, which, even under the microscope, will show no distortion of the star's image, although an error in the motion of not more than the twentieth part of one second would leave its mark upon the plate. What actual quantity this twentieth part of a second of motion represents may be gleaned from the fact that the telescope takes 24 hours to complete a revolution, so that the space passed over in this time would be little more than 1-2,000,000th part of a revolution. When the exposure is prolonged for hours and hours, a slight correction is necessary, due to the effect of refraction of the earth's atmosphere. Owing to this refraction, the apparent motion of the stars is not absolutely regular, and, therefore, it becomes necessary for the observer to keep an occasional watch upon the star during exposure through a second telescope placed beside the photographic instrument, and to introduce any slight corrections rendered necessary from this cause. The clockwork

which drives the Oxford instrument is of the same construction as that designed by Sir Howard Grubb for the telescopes installed by him with such conspicuous success at Greenwich, Cape Town, Melbourne, Mexico, Perth (West Australia), Madrid, Cork, etc. Some new features of special interest are worthy of note, the most important of which is that in connection with the circles. In the Oxford instrument all the silver divided circles can be read by one microscope fixed to the eye-piece of the telescope, so that the observer has no occasion to leave his seat to see that his circles are properly set. By turning a small lever fixed in close proximity to this telescope, one or other circle can be brought into the field of view, while the same motion causes a little electric lamp attached to each circle to be lighted up automatically, so as to illuminate the particular circle required. New slow motions have been designed, and in some cases, little electric motors are utilized to do this work, the motor itself being started and controlled by an electric switch of peculiar construction, available to the observer in any part of the room.

The latter is driven by delicate clockwork and controlled by a touch of the observer's finger.

The observatory for the accommodation of this instrument at Oxford is 60 feet from the ground level to the crown of the dome. It is equipped with the Grubb elevating floor, having a rise and fall of 9 feet; when the floor is at its lowest elevation the telescope may be pointed vertically, and when raised 9 feet the instrument is practically horizontal. The controlling gear of this floor is within convenient reach of the observer's chair, so that it may be manipulated in the dark, with perfect safety and without necessitating the observer's moving from his seat. As a rule, however, a telescope for useful work does not have to be brought lower than 20 degrees to the horizontal axis, as the earth's atmosphere at a more lateral elevation prevents accurate observations being made.

The floor is operated by a hydraulic ram, exerting a pressure of 50 pounds per square inch. As a matter of fact, however, this ram is not actually required for raising and lowering the floor, as the latter is so delicately counterbalanced by weights that a ram is only utilized to lift any extra weight, such as that of the observer, that may be standing on the floor. In the earlier types of elevating floor, there was a decided seesaw movement, as the observer moved from one side of the apartment to the other; but in this case, all such possibility of any tilting, no matter how great the weight placed at one side may be, is obviated. This is accomplished as follows: The ropes upon which the counterbalancing weights move up and



NEW EQUATORIAL TELESCOPE AT RADCLIFFE OBSERVATORY, OXFORD, ENG.

down are connected with the ram. When an excess of weight is thrown upon one portion of the floor, the downward strain tightens the ropes upon the opposite side, thus setting the hydraulic ram in motion automatically, and sufficient pressure is thus exerted by the ram to resist the excess weight of that particular spot. By this means the floor maintains its equilibrium and is absolutely rigid.

Further Experiments with the "Belleisle."

The British Admiralty has been carrying out some further gunnery experiments with the old coast defense ship "Belleisle," this time for the purpose of gaining information as to the resisting qualities of the steel armor which has been ordered for some time past for the latest cruisers. The "Belleisle" had been carefully prepared at Portsmouth Dockyard for the experiments. Into the forepart of the vessel had been built a replica of a 20-foot section of one of the latest armored cruisers, bunkers, water-tight compartments, and armored deck being all complete. On the starboard side of the ship, representing a cruiser of the "Monmouth" class, the target section was faced with four Cammell-Krupped 6-inch armor plates. On the "Belleisle's" port side, representing a cruiser of the "County" class, the target was faced with four Cammell-Krupped non-cemented armor plates approximately 4 inches thick. Some of the plates were backed with bunkers filled with coal. For the guidance of the gunners on the two attacking gunboats the position of these, and the place where the armored deck joined the ship's side were indicated by special marks. The "Belleisle" was moored about one mile off Bembridge, off the east end of the Isle of Wight. Between her and the shore two gunboats were stationed. The starboard side was first attacked from a range of 400 yards, four rounds being fired at it, two from a 6-inch gun and two from a 9.2-inch gun. Between the two rounds the Lords of the Admiralty and the gunnery officers, who were superintending the experiments, went on board the "Belleisle" and made a close examination of the effect of the lyddite and other projectiles used, and some photographs were also taken of the plates which had been struck. The "Belleisle" was then turned round, and the 4-inch armor on her port side fired into by the 9.2 and 6-inch guns, with the result that the plates were perforated and a plate either cracked or started below the waterline. The "Belleisle" took in water rather rapidly, and a tug was placed alongside to pump her out. It was deemed advisable to bring the trials to a close, and the vessel, with the plates which had been struck covered, so as to hide the results from view, was towed back into Portsmouth Harbor. The "Belleisle" will be docked to undergo careful inspection, in order that the effect of the experiments may be fully reported upon. The result of the trial, however, proved that cruisers of the "Drake" class are able to resist a heavy gun fire, but the 4-inch armor on the ships of the "County" class can be penetrated with the 9.2-inch gun. The special lyddite shell used in the experiments did not give the results anticipated, and practically its effect showed that lyddite-filled shell, or common shell, are of little use against armor. But the lyddite scattered its fragments over a huge area; in one case it hurled debris 1,200 yards. Some considerable space around where the shell burst was swept with fragments of shattered shell. Had a shell burst inside a battery, it would have completely destroyed it. In this direction plentiful evidence was given of its destructive qualities.

Paterson's Flood.

After having been almost wiped out by one of the fiercest fires which has ever raged in the eastern part of the United States, the unfortunate city of Paterson has now been swept by a deluge which has wrought fearful havoc. How great the loss will prove to be can only be guessed at now. It is estimated the loss to the county in bridges alone will amount to \$300,000. About four hundred small shops are said to have been flooded. The loss to their owners is inestimable; for it will be a considerable time before the stores can be opened again for business. At a conference held between the mayors of Wallington and Passaic it was calculated that the damage would probably amount to \$1,000,000. The Passaic mills will lose about \$600,000; while about \$200,000 damage has been suffered by owners of personal property. In Wallington the loss is about \$200,000.

The Franklin Institute has issued its report upon granite as an insulator. Granite chips were reduced to powder and calcined feldspar and kaolin added with water to make a plastic mixture. After the molded objects had been heated to 3,000 deg. F. they were glazed. The product crushed at 7,000 pounds pressure per square inch, and showed a tensile strength of 900 pounds per square inch. The sample tested showed an insulation resistance of eight megohms, but the size of the sample is not stated.

Legal Notes.

ENGLISH NEWSPAPER TITLE COPYRIGHT.—In the Chancery Division, Mr. Justice Swinfen-Eady recently gave judgment in the case of Willox vs. Pearson. It appeared during the proceedings that the plaintiff was the proprietor of the Evening Express, an old-established newspaper, with which was associated the Liverpool Courier. The paper was known throughout Liverpool and Lancashire as the Express. On December 2, 1901, the defendant, Mr. Arthur Pearson, published in Liverpool a paper called the North Express. Since that time the plaintiff claimed that the defendant's paper was called out in the streets of Liverpool as the Express, and that it was so folded and exposed that only the title Express could be read, and that consequently the one paper was mistaken for the other.

The fact of the plaintiff's paper being known as the Express did not give him any exclusive right to that title. Sir John Willox admitted that the appearance of his paper and of the defendant's was entirely different, and that there had been no attempt on the part of the defendant to pass his paper off as the Evening Express. The evidence of the plaintiff came to this—that street vendors of the defendant's paper had sometimes called out Express, and that people intending to purchase the plaintiff's paper received the defendant's paper instead. But people who purchased newspapers are supposed to be able to read. If they do so, the court held, they will immediately discover their mistake. Moreover, the defendant's was a morning paper, and the sale of it was practically over before the plaintiff's paper was on the street. Hence the two newspapers could not be said to come into serious conflict. The court therefore found that the plaintiff had failed to make out a case.

SOLID TIRE DECISION.—In the patent infringement case, the Rubber Tire Wheel Company vs. The Goodyear Tire & Rubber Company, Judge Wing, in the United States Court, for the Northern District of Ohio, at Toledo, decided in favor of the plaintiffs. Judge Wing based his decision largely upon the opinion of Judge Thomas in the case of the Rubber Tire Wheel Company vs. The Columbia Pneumatic Wagon Wheel Company, in which the validity of the Grant patent, owned by the Rubber Tire Wheel Company, was sustained. Judge Wing came to the conclusion that "while the elements of the complainants' combination are, each of them, old and well known, this particular combination of shape of rubber and of flange, and the position of the retaining wires, has not been shown in any previous patents or other publications." A permanent injunction was ordered to issue against any further infringement of the Goodyear Tire and Rubber Company, who thereupon presented an application for an appeal to the United States Circuit Court of Appeals. The appeal was allowed, and the Goodyear Company signed a bond under which they are permitted to manufacture tires as before, while the case is pending in the Court of Appeals. The bond covers all damages that may be suffered by the complainants if the final decision should be in their favor.

The Rubber Tire Wheel Company also won a suit in France, the case being that of Boudin vs. Rouy. The suit was one for damages for alleged infringement of the Grant patent on solid rubber vehicle tires which was issued in France, April 10, 1896. In America the tire is known as the "Kelly-Springfield Tire." Although certain claims of the patent were declared invalid on account of publication in the United States in 1894, the Court held the patent valid and to have been infringed. As a result the defendant was compelled to pay a preliminary sum of 1,000 francs damages in addition to a sum to be fixed by a board of experts, together with costs.

RIGHTS OF A PATENT ASSIGNEE.—In the Court of Appeals of the District of Columbia an opinion has been handed down in the case of Whitson vs. The Columbia Phonograph Company, which opinion clearly defines the rights of an assignee who has contracted to sell or lease patented phonographs with a company since become insolvent. The Columbia Phonograph Company, the complainant in the suit and the appellee, had received certain privileges from the North American Phonograph Company, which company, after the contract had been signed, became insolvent. The National Phonograph Company, claiming to be the successor of the North American Phonograph Company, sold its goods to Whitson Bros., dealers in phonographs in the District of Columbia. The Columbia Phonograph Company brings action to restrain the Whitsons; and the question involved in the case is: What are the rights of the Columbia Phonograph Company? The Court found that since the complainant acquired from the owners of the patents the exclusive right to deal

in phonographs in the District of Columbia, an injunction pending proceedings was properly granted by the court below to restrain the defendants from dealing in phonograph supplies. The fact that the company originally owning the patents is now insolvent and has gone out of business does not affect or limit the exclusive right given to the complainant. After rights under a patent have been granted, any person who obtains control of the patent with knowledge or notice must be assumed to have taken subject to such rights and is disqualified from infringing those rights.

THE REGISTRATION OF TRADE MARKS IN THE UNITED STATES BY RESIDENTS OF THE PHILIPPINES.—In the many arguments and decisions in the courts and their review in the literature of the day, the lawyer as well as the layman has been confused with the uncertainty of the status of the new island possessions of the United States and the residents thereof. The question comes up afresh in a recent case where a resident of Manila and a former subject of the King of Spain has been refused registration for his trade marks by the United States Patent Office.

Under the United States statutes a person "domiciled in the United States or located in any foreign country or tribes which by treaty, convention, or laws, affords similar privileges to citizens of the United States, may obtain registration" for his trade marks. In construing this law, the Attorney-General does not find anything which would authorize the registration of a trade mark in the United States in the name of a resident of the Philippines. It is held that the Philippines are not a part of the United States, neither are they a foreign county, nor are the tribes in the Philippines recognized as having power to make a treaty or pass a law for the protection of trade marks. The Attorney-General rests here, but if we investigate the matter a little further we will find that the statutes have in mind the protection of trade marks which are the property of persons residing in countries where provision has been made for the registration of the trade marks of citizens of the United States. Although the Philippines have no power to pass laws for the protection of trade marks, the United States Congress has such power, and through the War Department it has made provision for the protection of trade marks in the Philippines, which are the property of citizens of the United States. Leaving out of the discussion all questions as to the status of a country which is neither foreign nor domestic, and persons who are neither foreigners, subjects, nor citizens, it would seem in the spirit of the law, the residents of the Philippines are entitled to register their trade marks in the United States, for the bar to the registration has only in view the states, countries and tribes which will not permit the registration of trade marks, the property of citizens of this country.

SOMETIMES an invention, although it is apparently an improvement on an old device, which any skilled mechanic could have conceived in the regular course of his trade, is given the full protection of our patent laws, merely because it supplied the proverbial long-felt want. An example is found in the appeal taken by the Brunswick-Balke Collender Company against Thum et al., in the matter of which appeal Judge Lacombe handed down a decision in favor of the appellee. The patent in question was granted for improvements in a bowling apparatus, which improvement consist in a runway or trough for the return of the balls, so constructed that the balls are made to roll rapidly down an incline until near the players' end of the alley, and then up an ascending incline. The momentum is thereby so far checked that the force of the impact is broken, so that no injury can be sustained by a player who is engaged in picking out a ball. The improvement is extremely simple, and it would seem, a perfectly obvious application of the law of gravitation. Judge Lacombe stated that if there were nothing in the record but the bare statement of facts set forth, the charge of infringement which was sustained in the Court below against the company would not have been approved, but the evidence showed conclusively that this very demand for an arrester of the return ball had troubled skilled mechanics for many years and that no one before the patentee had hit upon the device which now seems so obvious. Indeed, the old-style runway has existed for some forty years, during which time there was a constant demand for an improvement which would remedy the difficulty. Suspended shot bags of various shapes, weighted sections of hose pipe, whisk brooms set to retard the traveling ball, pieces of stiff leather arranged shutter-like across the trough, levers having a piston entering a dashpot—in a word everything but the ascending incline had been tried for the purpose of arresting the momentum of the swiftly moving ball. In view of these many devices, the Court held that the patentee's improvements were certainly entitled to the protection of a patent. Thum's charge of infringement was therefore sustained.