

ing," which for the eleven months ending with November, 1904, showed a total of \$309,338,579, against \$293,439,440 in the corresponding period of last year. The other groups, "articles wholly or partially manufactured, for use in manufacturing," "articles manufactured ready for consumption," and "articles of voluntary use, luxuries, etc.," show in each case a slight decrease as compared with last year, the figures being: Articles wholly or partially manufactured, for use in manufacturing \$122,122,187, against \$140,845,440 in the eleven months' period of last year; manufactured articles ready for consumption, \$145,110,133, against \$159,872,017 in the same period of last year; and articles of voluntary use, luxuries, etc., \$122,184,867, against \$130,252,185 in the eleven months of 1903.

#### FOAMING OF THE WATER IN A STEAM BOILER AND ITS EFFECT.

BY CHARLES H. HASWELL, C.M. AND N.E.

There is not an element in the effective and economical operation of a steam boiler and attached engine, whether in land or marine service, and especially in the latter, that is pregnant with more results and casualties than the foaming, or "priming" of it (the latter a foreign term neither expressive nor derivative), inasmuch as it involves not only the wasted expenditure of heated water, by its flowing with the steam of operation into the cylinder of an engine; but, when its volume is in excess of that of the clearance space between the piston and the head or bottom of the cylinder, it involves the disruption of one of them. Upon the resulting arrest of the engine and consequent flow of steam to it, the foaming water, except when violently agitated by the motions of the vessel in which it is operated, subsides, and if its surface is below the upper surface of the furnace tubes or flues, as the case may be, it soon renders them incandescent, and as the result a collapse may ensue.

Before essaying to submit a remedy, or even an amelioration of this objectionable and destructive operation of foaming, it is proper to consider its origin. Ordinarily, it is the result both of an insufficient height and volume of steam space above the water line, and the *per saltum* flow of steam to the engine, consequent upon the periodic operation of the steam valves, which involves such undulations of the surface of the water that foaming ensues. It also occurs when the area of the surface of the water is less than that of the area over the crowns of the furnace.

With boilers where foaming exists, various expedients are resorted to, either to obtain additional volume of steam space by the addition of a cylindrical vessel, arranged as an integral of the boiler or attached to it, termed the drum, or by concentric cylinders set vertically at the termination of the flues or tubes, and rising to an elevation so far above the water level as to give space for the foaming water to subside before reaching the opening of the steam pipe. Upon this construction the smoke pipe is set, and the hot air from the furnace rising through the inner cylinder or chimney superheats the steam within the ring to an effective and economical degree. Another method is to extend the steam pipe into the boiler and attach it to the under side of the crown of the shell. The pipe is perforated with numerous small openings, and the steam, instead of flowing in a mass to the opening of the steam pipe, flows in minute currents from an extended surface, and foaming is materially arrested. This construction is termed a dry pipe.

Foaming renders it difficult, furthermore, to readily ascertain the actual height of the water in a boiler; and as the removal or correction of this difficulty is imperative, various devices in addition to the ordinary gage cocks of manual operation are used, such as a glass gage attached to the front of a boiler and connected to it, both above and below the upper surface of the flues or tubes by small connections, which arrest and reduce the foaming to a degree that shows the actual height of the water. Sometimes a metallic cylindrical vessel with a glass face is used, connected in like manner.

The loss in the cylinders from the super-hydrated steam due to foaming water is a material element in the question of the economy of a steam engine. The conditions, results, and constructions here detailed are well known, and they are introduced, not only as a record of the construction of the period, but to give value to the following illustration of a very common and effective cause of foaming in all boilers, and how it can be materially prevented.

In the operation of the furnace of a boiler, the heated water contiguous to the outer sides of it rises in vertical currents to the water line, and in a boiler where the water line is less in width than the extreme width of the furnaces, the ascending of currents of water in the condition of ebullition will be concentrated at the water line between the sides of the boiler and furnace; and hence a concentrated ebullition of the surface of the water or foaming much in excess of that which arises from the ordinary want of steam space will ensue, which in small marine vessels, where the

height under the deck is insufficient to admit of a drum, chimney, or like construction, is irremediable.

#### PASSAGE OF THE TRADE-MARK LAW BY THE HOUSE OF REPRESENTATIVES.

In our issue of January 14 we published an article by Mr. Arthur P. Greeley, late Assistant Commissioner of Patents, reviewing the bill presented by Mr. Bonyne (H. R. 16,560) for the relief of present trade-mark conditions. The House of Representatives has passed this measure. It must now be considered by the United States Senate and receive the President's signature before it becomes a law.

The main object sought to be accomplished by the bill, as pointed out by Mr. Greeley, is the registration of trade marks used in interstate commerce as well as those used in foreign commerce and in commerce with the Indian tribes; the formulation of a procedure which will give uniformity to the laws governing the registration of trade marks; the provision of additional penalties for the infringement of a registered trade mark; the reduction of the fees required on the filing of an application for the registration of a trade mark; the regulation of the procedure for the registration of a trade mark governing cases of interference or conflicting claims to the use of trade marks; the fulfillment of our treaty obligations with foreign governments.

Among the sections of the bill containing provisions differing from those of the present law, may be mentioned the first, which provides for the registration of a trade mark in use in interstate commerce, a provision that is sadly needed. Section 3 provides that if an applicant for registration is not domiciled in the United States, he must appoint some person who is a resident of the United States upon whom process may be served. Another important section is the fourth, which states that if a trade mark has been registered in this country, it shall have the same force and effect here as if filed here on the date of filing abroad, no certificate being issued in this country until the certificate has issued abroad.

In section 5, which has passed almost in the exact words proposed by Mr. Greeley, when he was a member of the Trade-mark Committee, the most important division is that giving full protection to common-law trade marks by providing that nothing shall prevent the registration of any mark in actual use as such for ten years. The sixth section provides for the giving of notice in the Official Gazette of contemplated registration, so that rival claimants to the same mark may file notice of their own titles.

The period of registration, according to the Bonyne bill, is twenty years, except that in case of foreign registration the registration in this country will cease with foreign registration. A trade-mark registration may be renewed upon payment of a fee and petition filed within six months prior to the expiration of the period for which a certificate was issued.

It is hardly to be expected that the bill will pass the Senate in its present form. Section 5 will need revision to meet the purposes for which it was drawn. It was intended in the last paragraph of that section to provide for the registration of marks which might not be technical trade marks, but which have acquired a certain vogue or recognition by use of ten years or more, and which have been in actual use as distinguished from "lawful" use.

Section 13 provides that any person who is injured by the registration of a trade mark may apply to have that mark canceled. The use of the word "injured" is not very clear, and may indicate more than may have been intended. It was probably intended to mean that any person may apply for cancellation of registration if he can show that a registered trade mark simulates one used by him and to which he has a prior right.

It is to be hoped that with the proper clerical corrections, the bill will pass the Senate.

#### ECLIPSE EXPEDITION FROM KIRKWOOD OBSERVATORY, BLOOMINGTON, IND.

The expedition is under the direction of Prof. John A. Miller, Professor of Mechanics and Astronomy, assisted by W. A. Cogshell, Assistant Professor of Astronomy; A. F. Kuersteiner, Professor of Romance Languages, who is now in Spain; and J. E. Valdez, a young Spaniard, who is a student at the university. These gentlemen are all members of Indiana University. The university has assumed financial responsibility for the expedition, but it has been aided by generous contributions from the Indianapolis News and the Reader Magazine, published at Indianapolis.

The equipment will consist of (1) A photographic telescope of 8 inches aperture and about 70 feet focal length. It will be mounted horizontally and fed by a celostat, the mirror of which is 14 inches in diameter. Five exposures will be made with this telescope. The negatives thus obtained, it is hoped, will give some information regarding the structure of the inner corona. (2) Four other cameras, varying in focal length from

80 to 60 inches, will be mounted on a polar axis. (3) There will be a battery of four cameras of 3 1/2 inches aperture and 11 feet focal length, with which photographs will be made in search of the intra-mercurial planets. Pictures of the region where the sun will be at that time will be made at the Kirkwood Observatory, in order to compare them with the photographs made at the time of the eclipse. The expedition will go to Spain, but the exact location has not yet been definitely decided.

#### SCIENCE NOTES.

Frédéric Mistral, the Provençal poet recently awarded \$10,000 as half share of the Nobel prize for literature, intends to devote this sum to the development and adequate installation of the ethnographical museum—Le Musée Arletan—founded by him some years ago at Arles. For this purpose the municipal authorities agree to make over an old palace, now used as a college, the restoration and adaptation of which will cost \$50,000. An American resident at Avignon, Mr. Edward Leon, has offered \$10,000 as a subscription, and will arrange for five lectures in the United States to help on the fund thus inaugurated.

The prizes for the year 1904 have been awarded, we learn from La Nature, by the Paris Society for the Encouragement of National Industry. The grand prix of the Marquis d'Argenteuil has been awarded to MM. Auguste and Louis Lumière for their discoveries in photography. The "chemical arts" gold medal has been awarded to M. Héroult for his works on electro-metallurgy, and the "constructions and fine arts" medal to M. Arnodin. Gold medals have also been awarded to M. Boulanger for his micrographic work, to M. Grey for a rolling-mill, to M. Guillet for his work in metallurgy, and to M. Schwoerer for his system of super-heated steam.

To those connoisseurs who evince great pride in their collections of Dresden china, it will come as a great shock to learn that to-day there is no such product under this name, although sold as such. In the course of a prosecution in London, where a firm was prosecuted for selling ware as Dresden and marking the goods as such, it was stated that no china is manufactured at Dresden. The name is applied to the products of the royal factory at Meissen. Furthermore, many pottery decorators at Dresden work upon china that is manufactured at different places, is transferred to that city, receives its imprint, and is then disposed of as Dresden china.

At a recent meeting in London of the British Ornithologists' Club were shown the legs of three lapwings, demonstrating the extraordinary injuries that are inflicted by the accidental entanglement of sheep's wool around the feet of the birds. In one instance so tightly had the wool encircled the bird's foot, that one of the toes had mortified and had dropped off, while in another case the bird had lost all its toes from this cause. The birds become entangled with the wool while flying among bushes and shrubs upon the animal's grazing ground, and also when they settle upon the sheep's backs, and their beaks are not sufficiently strong or long enough to remove the strands from their feet.

An interesting archeological discovery was made in the neighborhood of Bournemouth, England, recently. During the construction of a new road the excavators cut into a mound, which is indicated upon the maps as an ancient burial ground; and a large sun-baked clay urn was unearthed. It was in a remarkable state of preservation, and was intact, though in removing it the vessel was slightly damaged. The urn was only buried a few inches below the surface of the ground; in fact, the roots of the heather had forced their way into the interior of the receptacle into the ashes and dust it contained. Upon examination by experts, the urn was estimated to be two thousand years old. As this road will penetrate through other similar mounds, the work is to be conducted under the supervision of antiquarians, in the hope that other articles of archaeological value may be excavated.

According to Nature, an optical convention will be held, under the presidency of Dr. R. T. Glazebrook, F. R. S., at a date toward the end of May next, at the Northampton Institute, Clerkenwell, London, E. C. The object of the convention is to bring into co-operation men interested in optical matters. A sub-committee has been appointed to consider the subjects of papers on optical questions, which should be brought before the convention, and suggestions as to subjects for discussion will be welcomed. It has been decided to organize an exhibition, of a scientific character, of instruments manufactured in this country, with a view to show the progress recently made and to stimulate further efforts. In order that interest in the convention may not be confined to London workers in optics, a sub-committee is being formed to secure the assistance of local representatives. The honorary secretary of the convention is Mr. F. J. Selby, Elm Lodge, Teddington.