

numerously signed by the leading manufacturing firms of the State, the reason offered therefor being substantially that the conditions of insurance implied a full compliance with the spirit of the law, the sole object of which was to lessen the danger of boiler explosions, by periodic inspections and the restriction of pressure within safe limits. To this extent the object of the Hartford Steam Boiler Inspection and Insurance Company is the same. The end and aim of the law being thus attained, it was urged that the insured might, under proper restrictions, be justly and safely exempt from the charges and delays incident to official inspections. The legislature wisely saw the point and the amendment was adopted.

We say wisely, since, without impugning in the least the honesty and ability of the inspectors appointed by the government, it stands to reason that the supervision of parties having a pecuniary interest in preventing explosions, and restrained by no care for the cost of making doubtful property safe and sound, will be quite as rigid and exacting as that of the government, which assumes no such liability. Equally reasonable is it to expect that the agents of an insurance company, directly responsible in the premises, will be quite as carefully selected for integrity and special fitness for the work as the appointees of that transitory and irresponsible thing we call the government; and the inspectors so chosen will also be quite as likely to be free from corruption or favoritism in fixing the limit of pressure or in overlooking defects, the inspector's personal liability for damage by explosions being the same in one case as in the other.

We have referred incidentally to a feature of the work of the Hartford Steam Boiler Inspection and Insurance Company, which, though not a necessary element of their scheme, is one which bids fair to prove of great benefit to steam users, and consequently merits a somewhat fuller notice. It is the study of the officers making of what may be termed the pathology of steam boilers. Every application for insurance is accompanied by an inspector's report describing the boiler and its attachments in detail, and giving full particulars as to the setting and construction of the boiler, its age and maker's name, the kind of fuel used, the source and quality of the water supply, in short everything affecting in any way the durability and safety of the property. These facts are entered in a record book, and supplemented by the facts supplied by the monthly inspection reports, so that the history of every boiler with its attachments can be ascertained in a moment. In this way boilers are taken as they are used, the practices which obtain in different parts of the country are compared, the effects of different kinds of fuel and water are studied, together with the various safeguards and correctives employed; the working of different gages is observed under all sorts of circumstances, in fact all the fruits of widely extended and thoroughly systematized observation are brought to bear on the question why boilers explode, and on the practical problem of preventing explosion. It is impossible that such an accumulation of knowledge in regard to the wear and tear, the weakness and dangers of boilers, should not ultimately lead to practical results of the highest utility.

PATENT OFFICE JUSTICE.

In the matter of the interference case between H. H. Bigelow and S. W. Baldwin, before the Patent Office, the Commissioner of Patents, acting as it appears illegally, refused to permit the case to go before the Examiner in Interferences, who is the special officer designated by law for the hearing of such matters, thus preventing a final decision as to the question in dispute. Mr. Bigelow thereupon applied to the Supreme Court of the District of Columbia, for a mandamus to compel the Commissioner to do his duty. Judge Carter, after a full hearing of the case and of the excuses of the Commissioner, concluded that a mandamus must issue. The Court decided that the examiner in charge of interferences in the Patent Office is exclusively authorized by law to examine all cases of interference, whether between two pending applications for a patent or a pending application for a patent and an unexpired patent, and primarily to determine the question of priority of invention involved in either class of said applications; and that the Commissioner of Patents is bound by law to direct said examiner in charge of interferences to proceed to determine the said question of priority in invention.

Applicants for patents will necessarily be subject to delays, expenses and troubles, so long as the Patent Office, with its battalion of examining officials and assistants, four hundred in all, are permitted to act as inquisitors of inventors. Questions about the novelty of inventions and rights of priority between claimants must, under the American system, be finally decided by the courts. The only unsatisfactory part of our patent laws is that which subjects inventors to so many troubles at the Patent Office, before they can reach the courts. The Bigelow case is only one of many others. Had this applicant been a poor man, as the majority of inventors are, he probably would have been unable to lose time upon the case or spend money to pay lawyers in arguing for this mandamus; and the adverse whim of a Patent Office official would have stood as a permanent bar to his suit. What is needed is, to eliminate all such objections from the patent laws, and make it the simple duty of the Patent Office to issue a patent to every applicant who chooses to ask therefor, on presentation of suitable documents in proper form, leaving all questions relating to the validity of patents to the courts of law for settlement. This is the common practice in nearly all other countries in the world, and is found to work well. But in Prussia and the United States, the inventor is obliged to submit to the costs and annoyances of official inquests before he can obtain the patent cer-

tificate. In Prussia, the patent officials manage to interpose so many preliminary objections that nearly all applications for patents are rejected, while the government retains the money paid. In this country we grant more patents, but we nevertheless inflict upon inventors an immense amount of useless trouble, before issuing the certificate. Our Patent Office officials would consider their occupations gone and themselves of no account in the world if they were not privileged to hunt up objections to excite and harass the applicants for patents.

POLITICS IN THE BEEHIVE.

The idyllic picture of divinely appointed harmony, drawn by naturalists of the old school in describing the social economy of bees, is sadly disturbed by the prying observations of modern students. Instead of being models of industry and virtue, each and all, some of them, at least, prove to be no better than the rest of us, given to political dissensions, liable to bully royalty itself, and—tell it not to Watts—preferring theft to honest labor.

Lubbock has cast a grave doubt over their vaunted wisdom, and now Fritz Müller discovers that their virtue is as little to be depended on as that of our most pious statesmen. Happily they are not our bees that misbehave so badly, and it is only for Brazilian bees that the poet's verses will have to be amended so as to read:

How doth the naughty little bee
Improve the shining hour?
He robs his neighbor every day,
And never seeks a flower,

or something to that effect.

There is one species (*trigona liondo*), as Mr. Müller writes to Charles Darwin from the province of Santa Catharina, Brazil, which never appears to collect honey or pollen from the flowers. "It robs other species of their provisions and sometimes takes possession of their nests, killing or expelling their owners. The hives in my garden have often been invaded and two of them destroyed by these robbers; and I have seen in the forest several nests, formerly inhabited by other species, occupied by them."

Mr. Müller is making extended observations on the several species of these stingless honey bees, and expects, after a few years of study, to be able to give a tolerably complete account of them. The observations he has already reported, though briefly, give cause for expecting valuable as well as interesting results at his hands. On one occasion, for instance, he "assisted" at a curious contest well worth reporting, for the light it throws on the intellectual faculties and the political or social habits of the bees. It occurred between the queen and the worker bees in one of his hives of *trigona minim* whose peculiar custom it is to construct the cells in which the young are raised around the circumference of the two or three uppermost combs; when the cells are finished and filled with food for the grubs, the queen lays an egg in each, whereupon it is immediately shut. A set of forty-seven cells had been filled, eight on a nearly completed comb, thirty-five on the following, and four around the first cell of a new comb. "When the queen had laid eggs in all the cells of the two older combs, she went several times round their circumference (as she always does, in order to ascertain whether she has not forgotten any cell), and then prepared to retreat into the lower part of the breeding room. But as she had overlooked the four cells of the new comb, the workers ran impatiently from this part to the queen, pushing her in an odd manner with their heads, as they did also other workers they met with. In consequence the queen began again to go around on the two older combs, but as she did not find any cell wanting an egg she tried to descend; but everywhere she was pushed back by the workers. This contest lasted for a rather long while, till at last the queen escaped without having completed her work. Thus the workers knew how to advise the queen that something was as yet to be done, but they knew not how to show her where it had to be done."

Possibly the queen had some glimmering notions of royal prerogative, and did not choose to be quite so forcibly advised by her subjects, who appear to have been a turbulent lot at best, since it was in this hive that Mr. Müller found two dissenting parties among the workers quarreling about the construction of the combs, and even going so far as to destroy each other's work.

THE LOCUST IN MINNESOTA.

The visitation of locusts in Minnesota has proved a serious calamity. The total damage, thus far done, consists in a loss of about one twelfth the usual crop, or about the same as if the average yield throughout the State were diminished one and a half bushels below the average per acre. The plague extends over one tenth of the cultivated area of the State, and involves about one thirteenth of the population.

The insects, we notice, are universally styled "grasshoppers," which is incorrect, although the mistake, owing to the confusion of names, is a natural one. The principal points of difference between the locust and the grasshopper consist in that the latter is usually of a green color and is more active by night than by day. Grasshoppers, moreover, do not associate together nor migrate in large numbers, while their flight is short and unsteady as compared to that of the locusts, beside being noiseless. The locusts which have appeared in Minnesota are, when full grown, of about an inch and a quarter in length, and of a dusky grayish color, the heads being reddish and the under wings, when spread, of a coppery hue. The eggs are gray, ovate, and about as large as a wheat corn, and are deposited in clusters in the ground and under the grass and stubble. When hatched, the insects feed on the nearest vegetation, and then rise in vast clouds, seeking other pastures. A Minnesota settler, who has suf-

fered severely from their ravages, in writing to the *Minneapolis Tribune* describes a throng of the locusts as resembling a huge snow cloud, often completely obliterating the sun. The lower insects fly at a height of about forty feet from the ground, and the others fill the air above as far as the eye can reach. When they settle on a field of grain, every stalk is covered, so that the entire field seems to have suddenly turned brown. They do not eat the grain but bite into the tender stock and juicy kernel, and suck out the vital sap, leaving every particle of vegetation dead, so that within a day or two the entire crop becomes dry and withered. Their appetite seems especially directed toward garden stuff and grain, but frequently the voracity is such that every living green thing is devoured before they rise.

Minnesota farmers assert that there is no remedy. Fall fires do no good and water and frost are without effect. Plowing up the ground where the eggs are deposited or burning over the grass where they are laid during the spring, it is believed, are the best known preventives. The worst enemy of the locust, however, seems to be a little red parasite, which gets under its wings and gnaws into the very vitals of the insect. Dead locusts are found covered with these worms. Various portions of Europe and the north coast of Africa have suffered greatly from the plague both recently and in the past. In France, during May and June, when the insects first appear in the fields, all the women and children turn out to hunt them. Four persons grasp the corners of a sheet, two in advance holding their ends close to the ground and the couple in rear elevating their corners, so that the sheet is held at an angle of 45°. In this position, the cloth is carried over a field several times, the insects being forced to rise, when they fall upon the sheet and thence are tumbled into bags. Some idea of the immense numbers of the locusts which may thus be destroyed may be gained from the fact that a single peasant, with an entomologist's small net, has been known to capture 100 pounds of insects in a day, equal to about 89,000 eggs destroyed.

The Arabs drive off locusts by making great bonfires, producing large quantities of smoke. In Algiers, the most effective plan is said to be spreading large nets over the insects early in the morning after they have become gorged and inert through feeding, and then collecting them in bags and bury them in lime. Leaving the dead bodies on the ground is apt to breed infection. Harrowing over the fields, where the females lay the eggs, seems, however, to be a widely followed plan of destruction, as, if the eggs be scattered, the sun soon dries them up. Birds and toads are excellent auxiliaries in disposing of the eggs after a field has thus been gone over.

FOUR HUNDRED AND FORTY-FOUR MILES, AT OVER FORTY MILES PER HOUR, AND THREE STOPS.

An evident improvement in the direction and appointments of the principal American railways is in progress, an example of which is seen in that portion of the Pennsylvania Railway between New York and Pittsburgh. The road is provided with 60 lbs. steel rails, oak ties, broken stone ballast, and the best splice joints. The bridge work is of the most substantial character, the superstructure is smooth and solid, the cars and locomotives superior in construction, all the latest appliances for safety being likewise supplied, such as Westinghouse air brakes, safety platforms, switches, block telegraph signals, etc.

The run of 444 miles from Pittsburgh to New York is made in eleven hours, with only three stops, being an average rate of over 40 miles an hour, as follows: Pittsburgh to Altoona, 117 miles, stop 5 minutes; to Harrisburg, 132 miles, stop 20 minutes; to Philadelphia, 105 miles, stop 5 minutes; thence to New York, 90 miles. The locomotives dip up water from side troughs at certain stations without stoppage. The trains are comprised of magnificent Pullman parlor cars. It would be difficult to name any stretch of railway in the world, of equal length, where passengers can be more expeditiously and luxuriously carried.

The railroad mileage of the United States now exceeds the combined mileage of all Europe, although the population of Europe, 282,000,000, is seven times greater than that of this country. Every year adds to the improvement as well as the length of American roads. How to make our railways better and safer is the constant study of the legion of engineers, inventors, and managers who are connected with them. The practical results of their labors will be naturally manifested in gradual changes for the better in all branches of railway service.

The Annual College Regatta.

The annual regatta of the principal colleges took place this year on Saratoga Lake, N. Y., July 18. The winning boat was that of Columbia College, New York, which came in two boat lengths ahead. Time 16m. 42 sec. Distance three miles. Wesleyan was second, and Harvard third. The colleges which contended were Trinity, Princeton, Cornell, Yale, Harvard, Wesleyan, Columbia, Dartmouth, and Williams. The attendance of spectators was very large, and much enthusiasm prevailed.

PHOSPHORUS BRONZE.—Some of the brands will bear a considerably greater breaking strain than steel itself. It appears, also, to be suitable for sheathing ships, since, when immersed in sea water, it loses scarcely more than one third as much as is lost by the best sheet copper.

MINERAL OIL may be detected by its property of imparting a fluorescence to animal or vegetable oils, and by its aromatic odor on burning. The presence of resin may be ascertained by its giving a deeper color with nitric acid than that given by the pure oil.