

Wales," "On the Treatment of Auriferous Pyrites," "On the Forage Plants Indigenous to New South Wales," and "On the Influence of Australian Climates and Pastures on the Growth of Wool"—are to be sent in before the 30th of September next. The other four—"On the Chemistry of Australian Gums and Resins," "On the Water Supply of the Interior of New South Wales," "On the Embryology and Development of the Marsupials," and "On the Infusoria Peculiar to Australia"—must be submitted before August 31, 1883. The competition is unrestricted, and as some of the subjects may be investigated outside of Australia, the contest may be of interest to students in this country. The office of the society is in Sydney, N. S. W.

STEAM BOILER NOTES.

The late boiler explosion at Jewell's Flour Mill in Brooklyn, N. Y., a short notice of which was given in the last number of the *SCIENTIFIC AMERICAN*, has drawn attention in a special manner to a State law relating to boiler insurance and local official inspection of boilers. It is alleged that the passage of the law was much influenced if not entirely procured by the agents of boiler insurance companies, both native and foreign to this State. The following is the clause of the law that is quoted by the Brooklyn *Eagle* as applying to that city, which was passed in 1874. It has been repealed or amended since the Jewell explosion:

"SECTION 1.—All steam users, manufacturers, or corporations possessing the guaranteed certificates, unrevoked and in full life, of any fire insurance company now incorporated, or hereafter incorporated, or of any company organized or hereafter organized, for the purpose of making guaranteed steam boiler inspections, and which have complied with the insurance laws of the State of New York, having duly filed a statement with the Superintendent of Insurance or other authorized officer, of its conditions, and duly paid license fees and taxes, shall be exempt from any further inspections, and from the pains and penalties of the above-named acts."

It appears to have been applicable to insurance companies making boiler insurance a part or the whole of their business. In some cities and States, notably in the State of Connecticut, the certificates of such companies only as make boiler inspection and insurance an exclusive business are sufficient to exempt boiler owners from official inspection and control.

In other localities, the city of Philadelphia, for example, all boilers that are insured must be tested annually by hydrostatic pressure according to law, and the city inspector, who is independent of the police, but under the direction of and appointed by the mayor, may disapprove of any boiler for a given pressure, notwithstanding the boiler has been approved and insured at that pressure.

It seems, however, that none of these laws that leave the matter of limiting the pressure at the discretion of a single person, the chief inspector of an insurance company or the local inspector, as the case may be, are sufficient to prevent either interest or prejudice from becoming an element in the problem of how much pressure may or may not be allowed in a given case. There being no rule or law except the judgment of the inspector, too much latitude as well as too much risk is often assumed by even the most competent inspector. And as a rule they are generally arrogant and conceited in inverse ratio to their fund of practical science.

In the Jewell explosion investigation, which was begun before the coroner on the evening of February 27, it came out that the two exploded boilers were twenty-one years old, seven feet diameter, composed of iron "a full quarter" of an inch thick, and that the owners, having increased their machinery, required more steam than thirty pounds, which they had previously carried, and which was ample for their purposes at that time. Whether or not this increase of pressure was denied them by the city inspector did not appear, but the Hartford Steam Boiler Inspection and Insurance Company were ready to take the risk at fifty pounds, after having ordered a number of soft patches to be put on defective seams on the bottoms of the shells. They were then inspected, testing with a hammer, and proved by personal examination internally and externally. They were accepted for insurance, and a \$10,000 risk was assumed by the Hartford Company at $1\frac{1}{4}$ per cent premium, the policy taking effect some twenty months before the explosion took place. They were again duly inspected at the end of the year—the hydrostatic pressure was not applied on this latter occasion—and the policy was renewed, and a certificate for fifty pounds of steam issued on the 14th of June, 1881, which was to expire on the 14th of June, 1882.

It would seem that a competent State commissioner ought to be appointed to establish a rule for the limitation of steam pressures. The rule may be very simple, something on the model of the Manchester Board of Trade rule, which is simply to determine by one process of multiplication what thickness of good fair iron is required for a given pressure on a cylindrical shell. For example: On a seven foot shell to carry fifty pounds of steam, required the thickness of the plates, single riveted? Rule: Multiply the diameter in inches by the pressure in pounds, and point off all the figures in the product as decimals, which will be the thickness in decimals of an inch; thus $84 \times 50 = 0.4200$, nearly seven-sixteenths of an inch.

Calling the Jewell boilers 0.3 of an inch thick, and all other parts equally strong, 35 pounds of steam would have been allowed and no more under this rule. On the other hand, if 50 pounds pressure must be had, the boilers being

still the same diameter, their shells would require to be about seven-sixteenths of an inch thick, with all other parts fully as strong. It is more than probable that, under this rule, the boilers having been well cared for, the defects from which the explosion arose would not have been developed to a dangerous degree and no explosion would have taken place.

COTTON PICKING BY MACHINERY.

BY PROF. C. V. RILEY.

In perusing the article on "Cotton and its Future—An Opportunity for Invention," as appearing in the *SCIENTIFIC AMERICAN SUPPLEMENT* of February 11, 1882, one acquainted with the cotton country and the actual work of harvesting the crop, cannot but be struck with the impracticable nature of most of the notions presented. That the devices described and the ideas advanced are chiefly those of men unfamiliar with the requirements which they have attempted to meet is easily seen. It is surprising to notice that most of the cotton-picking inventions, as shown, are the product of Northern minds, and this may account for their being so foreign to the work which they were designed to perform.

Three principles have been employed. One is that of raking off the cotton by points which are coarse or fine, and grouped comb-like or brush-like; the second is that of applying spindles on which the fiber is to adhere and wind into rolls; while the third is that of suction by an exhaust apparatus.

These principles, as applied in hand-pickers for taking one boll at a time, are inferior to the bare hand alone, and only offer superfluous complications and expense.

As used in large machines to be hauled over the rows, all so far contrived seem better calculated to injure and waste cotton than to gather and save it. The inventors do not seem to have taken into consideration the fact that the crop does not all open at once, and that it must be gathered by a series of successive pickings, at each of which only a portion of the entire crop is open.

They appear to proceed on the erroneous idea that the whole crop matures and opens at the same time, so that it can be gathered all at once, while the plants may be dealt with, injured, or destroyed as though they were of no further value.

No planter will admit to his field a machine to pick the first crop that will damage the second, or to gather the second if it will impair the "top-crop." Hence planters have no use whatever for such contrivances as have so far been patented.

Where the raking principle is introduced in large machines the plants are sacrificed and torn in a manner not allowable, while spindles which scratch or drag through the plants must similarly break off the branches, leaves, and unopened bolls.

If those machines which employ the suction principle have been made to do less injury than the others to the after-crop, they do the work little better and possess in the highest degree a fault common to all, which is that of taking up with the fiber fragments of the foliage and bolls, besides dirt, etc., thus greatly impairing the market value of the cotton.

The fact is the question of harvesting cotton by machinery is a most difficult one, which, like that of gathering the great corn crop of the North by similar means, has baffled the best genius of our country, and, unless some other principles than those in the machines thus far patented can be introduced, the problem must remain unsolved. Let those who wish to exercise their ingenuity in this direction not forget that cotton harvesting extends over a period of two or three months in any given field; that the cotton when gathered is valuable in proportion as it is clean, *i. e.*, free from leaf, dirt, trash, etc., and that no machinery in which these considerations are ignored stands any chance of superseding the nimble fingers of a young dandy.

American versus English Nailmakers.

Discussing the prospects of the nail trade the Birmingham correspondent of the London *Ironmonger* says:

Foreign competition in this branch is relaxed by the action of the American nailmakers, who have advanced prices from 15c. to 20c. per keg. These advanced rates, which are much above those demanded by English makers, have of course greatly improved the chances of English nails in Canada, Australia, and other neutral markets, though many even of our own colonists appear to be strongly biased still in favor of the American article, owing to its greater uniformity of quality. It is not denied that English manufacturers can produce as good or even a better nail than the Americans, but they do not always do so; and the merchants who conduct the trade are apt, in buying, to sacrifice higher considerations to cheapness. The Americans are wiser in their generation, and, frankly recognizing the impossibility of competing with English makers in cheapness, they strive to excel in quality, uniformity, and excellence of patterns. On the whole, these tactics have been of great service to them, and have given them a footing in many markets from which it will be no easy matter to dislodge them.

REMEDY FOR SIMPLE CONTINUED FEVER.—Acid. hydrobrom., 1 dr.; Syr. simplicis, 2 dr.; Aq. ad 1 oz. M. Sig.—Every hour.—*Fothergill*.

Dr. Fothergill, in speaking of the above formula, says it will probably constitute *par excellence* the fever mixture of the future. It is especially indicated where there is cerebral disturbances.

About Fires.

To the Editor of the *Scientific American*:

It appears to me that all the methods proposed deal with the fire from the outside, whereas the fire is in the inside of the building, and it is upon the inside that the remedy should be applied.

It is idle to talk about fire-escapes, fire-engines, and such appliances, with buildings so high that no stream of water will reach the top, and no ladder is long enough to be of service. During the late fire several people were burned up before the fire department even got there. What is wanted is instant application of water from the inside the moment a fire occurs.

At my works I have a device which is simple and effective. Having to deal constantly with fires, I require something that is instantaneous in its action. My device is a railroad tank, at the bottom of which is a large pipe, closed by a valve. From this pipe perforated pipes lead to every point in the factory where fires are expected. The short end of a lever at the top of the tank is connected by a chain with the valve at the bottom. When a fire occurs, the long end of the lever is pulled down, by which the valve is opened, and every point desired to be reached is treated, as it were, to an instant shower bath. This same device could be applied to any of our large buildings and to our theaters, by which arrangement the whole stage could be treated to an instant shower bath. Perforated pipes could be led over the top of the stage and over all the combustible scenery. In buildings, I would suggest two large tanks near the roof, from which perforated pipes should lead over the elevators, all the hallways, stairs, and such rooms where combustible material is stored or being manufactured. The connection with the lever of the tank or tanks should be so arranged that the valve could be pulled from every hallway.

I feel satisfied that with the above device no loss of life and no serious loss of property could occur, and I confidently recommend it after an experience of twelve years, during which time it has never failed me.

PAUL A. OLIVER.

Wilkesbarre, Feb. 21, 1882.

Daniel F. Beatty's New Organ Factory.

Last fall, as our readers will remember, the extensive organ factory of Mr. Daniel F. Beatty, at Washington, N. J., was entirely destroyed by fire. The work of reconstruction was begun at once with the owner's characteristic energy, and within five months a new establishment, larger and more admirably furnished than the old one, was ready for operation. It is now turning out thirty organs and pianos a day; an output which the proprietor says can be doubled in thirty days and trebled in ninety days.

Mr. Beatty's splendid success as a manufacturer of musical instruments is due very largely to his plan of reaching his customers without the intervention of middlemen. In this way the buyer gets his piano or organ free from intermediate charges; and Mr. Beatty's rare executive ability and capacity for organizing labor reduce the single profit—the manufacturer's—to the lowest figure.

Spontaneous Combustion of Bengal Lights.

The author shows that the spontaneous explosion of mixtures containing potassium chlorate along with sulphur is generally due to a trace of sulphuric acid present as impurity in the latter substance, and he agrees with M. Du Moncel in rejecting the theory which ascribes such accidents to electric action.—*J. Clouet, in Journal de Pharmacie*.

Plugging Diamond-Drilled Hole.

It is no easy matter to plug up a diamond-drill hole from which there is a strong flow of water, frequently under great pressure. When a hole is to be plugged there are forced into it small bags of beans and flaxseed. The plug—made of dry pine and from 10 to 15 feet in length—is driven in after these bags and forces them forward in the drill hole. Also, a hole is sometimes bored into the end of the plug, which hole is filled with flaxseed. The flaxseed and beans are caused to swell to such an extent by the hot water that the hole is as compactly filled as though closed with molten lead.—*Virginia Enterprise*.

A Curious Ceremony.

That enthusiastic student of Zuni life and religion, Mr. F. H. Cushing, of the Ethnological Bureau of the Smithsonian Institution, has brought to the East from New Mexico six chiefs of the Zuni tribe of Pueblo Indians, to enable them to perform at the sea-side an ancient ceremony which has been handed down in its minutest details from a period so remote that tradition is unable to say when it was last performed. The ceremony is proof that the ancestors of the Zuni once lived on the shore of an ocean, but what ocean and at what point are problems for science to work out.

Patent Cases in the Court of Claims.

The House Committee on Patents agreed, February 23, to report favorably Mr. Stephens' bill providing that the jurisdiction of the Court of Claims shall include all claims against the United States for the use of patented inventions employed in the public service. The need of this extension of the jurisdiction of the Court of Claims was discussed in these columns in the article on the "Relation of the Government to Patentees," in the issue of February 18.