

in an air chamber in the roof, extended into a hood covered with very fine wire gauze, and carrying in the end a wicket opened and closed by a rod. In the bottom of the chamber is a register through which the air is forced down the center aisle of the car. The rear gate acts as an exhaust. So far the plan resembles Mr. Gates'. For summer use, when the windows have to be open, the rear gate is closed, and deflectors are used to prevent any inrush of smoke or dust at the windows, and to serve as an exhaust. The chief objection seems to be that it is costly, and the air is not warmed.

Evidently there is a good field here for our inventors to cultivate, one likely to be profitable to them and very beneficial to the traveling public.

TIMELY KEROSENE DANGERS.

While the mercury remains in the nineties and occasionally rises above 100°, it will be a prudential measure to keep a sharp watch on any kerosene oil that is being used. There are large numbers of rascally or ignorant dealers who sell a compound containing gasoline and other light products which will readily flash at 100° and often at 90°. As it is the gas or vapor from the oil that explodes, it is hardly necessary to point out the danger of keeping a material in the house which, during the intense heats of summer, will reach a state when such explosive gas is freely evolved.

Public attention may also here be called to the peril incurred in using kerosene on traveling conveyances. We notice that in several instances it is being used on railway cars in place of the safe candle; and on steamboats where coal gas is not employed, it is the only mode of illumination. It is curious to remark that for marine purposes the thoroughly reliable sperm oil is gradually becoming obsolete; and that even for vessels' side lights, where certainty of continuous illumination is the prime necessity, kerosene is being used. Sperm oil is actually difficult to obtain in this city, even in comparatively small quantities.

Of course, in the confined limits of vessels and railway cars, the perils from kerosene are greatly augmented; and where inspections by government officials, as in the case of steamboats, may carefully be made, we think that such should include a most rigid investigation into the kind and nature of oil employed. There are, of course, certain kinds of kerosene in the market practically as safe as sperm oil; but on the other hand, the poorer and more dangerous grades are cheaper, and hence are used both through ignorance and cupidity. The steamboat law is extremely explicit on the subject of explosive compounds, and it covers all cases, whether the material is barreled for freight, or innocently contained in the cabin chandelier. It distinctly states that "no products of petroleum shall be used on any steam vessel for illuminating purposes that will ignite at a lower temperature than 150° Fah." The penalty for carrying dangerous explosives is \$5,000 fine, or three years' imprisonment, or both. The law is certainly stringent enough, and it remains for the authorities to enforce it, otherwise some frightful conflagration aboard a steamboat may be the result of their neglect.

We mention steamboats more especially because at this season of the year they are almost always crowded, and an accident, even through panic alone, may easily assume very serious proportions. Kerosene, we think, has no place on railway cars; it does not give an adequate light for reading at night, nor is it in any respect, save, perhaps, in point of expense, an advantage over the time-honored candle. In case of a collision or overturn of the cars, the breakage of the lamps and spilling of the oil have often produced a fire and a panic, and will so again if the companies persist in allowing its use.

THE THUNDERER BOILER EXPLOSION.

The double-turreted English ironclad Thunderer was recently the scene of a terrible boiler explosion. The vessel was built some three years ago but, had never been fitted for sea nor had her machinery tested. She had eight boilers of the common low pressure type, which supplied steam to twenty-six small engines for performing various work, besides to the main propelling engines, of 800 horse power. An official trial having been ordered, on the measured mile, near Spithead, steam was got up. The safety valves were supposed to be loaded to blow off at 30 lbs., and a large force of experienced firemen were employed under the Chief Inspector of Machinery. Fires had not long been started when a loud, sharp explosion, exactly resembling the report of a 38-tun gun, was heard, and vast clouds of steam poured up from below. The destruction was terrible. The men in proximity to the boiler were torn to pieces, while others, cooped up in the after-hole, were literally boiled to death. Fifteen persons, including the chief engineer, were killed instantly, and fifty-six were wounded. The end of the forward boiler on the starboard side was blown completely out, the uptake and main steam pipe were hurled bodily away, and the after fire room, generally, was a ruin.

It was supposed (and in the detailed accounts of the disaster which have reached us by mail, it is so stated) that a deterioration had taken place in the boilers, rendering them weak, owing to the lapse of time intervening between their reception from the contractors and the special trial. A telegraphic despatch, however, coming before the mail, reported the result of the official investigation, and the accident appears to have been due to the most inexcusable negligence. Previous to the steam trial, the boilers had been tested by hydraulic pressure, and, of course, all the safety and other relief valves were tightly fastened down by steel wedges. The wedges were forgotten. The pressure soon exceeded the strength of the plates, and the explosion was a necessary consequence. Those watching the steam gage must

have seen its rapid ascent; and certainly it seems impossible that they could have failed to remark that the safety valve was not lifting after the 30 lbs. set pressure had been attained, and to have taken measures promptly to discover the cause; but the most cautious of men, on the other hand, cannot reasonably be expected to foresee and guard against the consequences of such inconceivable blundering as here appears to have been the case. This is the third serious disaster which has occurred to the English ironclads within a year, the previous casualties, the sinking of the Vanguard and the collision of the Iron Duke, being due to negligence but little less culpable.

THE CENTENNIAL EXPOSITION.

As the days have grown cooler, the attendance at the Centennial already shows gratifying signs of increase. Excursion parties, wisely postponed until the conclusion of the hot weather, are now arriving in rapid succession. Whole militia regiments from this city, college students by the hundred, miners of the Reading Coal and Iron Company by the thousand, bands of workmen from factories, besides the throngs of individual visitors, fill the buildings to an extent which is suggestive of the crowding which must take place when the September rush begins. The Granger excursions, and the farmers generally, are waiting to gather the harvests, and also for the great agricultural display of live stock, etc., to open later in the season. From present indications we think that those who contemplate a careful study of the Exposition will do well to make their visits now rather than risk later the annoyances which must follow the presence of a great crowd. If the interest which the people are taking in the show on one hand, and the comparatively small attendance during the past few weeks, are any criterions, the estimates made of the throngs which will pack the buildings in September and October are more likely to be exceeded than otherwise. Every department is now in perfect order, and the most elaborate of examinations can be comfortably and leisurely made.

Preparations for the live stock show, to be open from September 21 to October 4, are being rapidly advanced. A new entry is announced, which will be of the greatest interest to our stock raisers, in the shape of a drove of 100 of the choicest English cattle from the flocks and herds of Lords Chesham and Walsingham, the Royal Agricultural School, and others. The show of sporting dogs, to be held on September 4, 5, 6, 7, 8, also will be very attractive, a superb collection being expected from the celebrated English kennels. A large number of valuable prizes have been offered by private parties for the finest animals of various breeds. The American Forestry Association are to meet on the grounds early in September, and probably some useful suggestions will be forthcoming relative to the preservation and protection of forest trees.

THE ENGLISH COLONIES.

Four of the five Australian colonies, Victoria, New South Wales, South Australia, and Queensland, are represented at the Exposition. The fifth colony, West Australia, a penal settlement of scanty population, sends nothing. The vast gold production of Australia and New Zealand is represented by a tablet which faces the visitor at the entrance of the Victorian section. This gives statistical figures showing that, since 1851, the colonies have produced \$1,220,823,034, a vast sum which affords an idea of the great rôle which the precious metal has played in the development of these young and vigorous provinces. An excellent feature of the Victorian exhibit is a collection of photographs grouped in frames of uniform size, illustrating the scenery, towns, and principal buildings in each of the shires into which the colony is divided. The most striking landscapes are presented in large oil paintings. Wheat, barley, oats, and wool, the last in fleeces of remarkable size, are the principal agricultural products exhibited. There are, besides, a fine collection of minerals, cases of stuffed birds and animals, shelves of ales and wine, cordage, stone ware, and food preparations of all kinds.

The adjoining section is that of South Australia, the agricultural resources of which are better than those of any other colony, although the mining interests are very small. The southern portion is claimed to be the finest wheat-growing country in the world. No less than 112 varieties of wine are shown. A series of photographs represents the rural life of the colonists, and the same graphic means is resorted to to show how a telegraph line was constructed across the island. The most curious exhibit in the section consists in the novel and beautiful objects made of the eggs of the emu. These are as large as ostrich eggs, and have a dark green surface resembling granulated morocco leather. They are superbly mounted in silver. One of the most elaborate pieces represents the egg (which opens and forms a casket) as a rock on a hill overshadowed by a peculiar indigenous tree. On the slopes of the hill groups of natives, in oxidized silver, are seen hunting emus and kangaroos. Another shows a group of gold miners at work, in the egg, and a lively encounter between natives armed with spears and clubs is going on outside in the midst of singular vegetable growths.

The New South Wales court is larger than that of either of the other colonies. A mineral trophy contributed by the Government Department of Mining is, after the great yellow column representing the gold production, the most prominent object. It consists of four large buttresses of coal from different mines, and of specimens of iron, lead, tin, copper, and auriferous ores. There is also a fine collection of tin ore specimens. Among the many photographs is one, a view of Sydney Harbor, which measures five feet by three feet four inches. This was printed from a negative of

similar size, and one of the largest in the world. A pyramid of wine bottles, it is said, contains over 100 kinds of wine. There is a small collection of peculiar birds, among them being the "settler's clock" (*Acuclo gigantica*) that salutes the rising sun with a sound resembling a laugh, and the Herodias crane that carries, attached to the middle of its back, a number of long skeleton feathers which it can erect at pleasure. Kangaroo leather, used for boot tops, is displayed in abundance, besides excellent exhibits of wool, woolen fabrics, and native woods.

Queensland divides her wall space into black panels, in which are descriptions and statistics of the different parts of the country. Near the appropriate tablets are landscapes, and also specimens of products of the various sections. A gold pyramid, and exhibits of wines, wools, oils, etc., fill the center of the court.

New Zealand exhibits bituminous coal from sixteen different seams, a pyramid of gold, a fine collection of ores and samples of crude petroleum too heavy for anything but lubricating purposes. A singular substance is the Kauri gum, a vegetable deposit found about six feet below the surface of the ground, in lumps of all shapes and sizes. It is supposed to have been distilled by Nature from a species of conifer. It is worth \$200 a tun in New Zealand for making varnish. There are also some good specimens of the *phormium tenax* or New Zealand flax, worked into ropes and mats, and an interesting collection of garments, weapons, etc., of the Maoris, besides industrial products of all kinds.

Tasmania shows principally wool, wheat, and the dressed furs of a number of singular animals found only in the Australian group, including the platypus, kangaroo, wirubut, bandicoot, and the Tasmanian devil. There is a curious jelly for table use among the food productions, made of seaweed, and a photograph of the last aboriginal Tasmanian, the sole member of a race supposed by Haeckel to be nearest of all to our alleged monkey ancestors.

Ceylon sends coffee, nutmegs, tapioca, pepper, gums, and gamboge, all raw products. Singapore sends a similar display, with the addition of some plumbago, and an elephant carved in that material by a native. Mauritius displays samples of arrowroot, sugar, medicinal plants, and a collection of ethnological types. The Archipelago of Seychelles, a dependency of Mauritius, sends sixty-seven varieties of woods, besides cocoa, cloves, and coffee.

The Cape of Good Hope covers the inside of the allotted section with skins of wild animals and elephants' tusks, and crowds the space inside with ostrich plumes, dried plants, wools, etc. There are some curious necklaces and bracelets of melon seeds and steel beads, ostrich eggs converted into cups and card baskets, and a model of a leviathan incubator, flanked by two ostrich chicks as specimens of its work. The Gold Coast colony exhibits curiously artistic gold ornaments and wood carvings, the work of natives.

Jamacai, West Indies, displays nuts, barks, spices, rum, arrowroot, and yam flour, breadfruit meal, cassava starch, coffee grown at 5,000 feet above the sea level, said to be the finest in the world; beautiful fancy articles made from a lace bark of the lagetta tree, and artificial flowers, looking like wax work, but formed from the cuticle of the leaf of the *Yucca alvifolia*. The Bahama Islands send exquisite wreaths and sprays made from little pearly white shells, baskets made of mimosa beans, and specimens of tortoise shells, sponges, etc. Bermuda contributes corals, palm leaf fans, cups and boxes of cedar, and a model of the great floating dock, besides sending frequent shipments of vegetables to Agricultural Hall. From Trinidad we have fifty-seven samples of native woods, crude gutta percha, Angostura bitters, crude asphalt from the great Pitch Lake, and various vegetable fibers adapted for cordage. Guiana sends samples of sugar and rum.

This completes the list of the productions of the English colonies: a display which for completeness and instructive value is, as a whole, one of the finest in the great Fair.

Progress of the Railway Tunnel under the Hudson River, New York city.

In April, 1875, we gave the details and drawings of the Hudson River Tunnel, projected by Mr. D. C. Haskin, of this city, and designed to establish direct railway communication between New York city and Jersey city. The work was begun by commencing a vertical shaft of brick masonry, 30 feet in diameter and 4 feet thick, at the junction of Jersey avenue and 15th street, on the New Jersey side, between the present depots of the Erie and Delaware and Lackawanna railways. After the shaft had reached a depth of about 20 feet, the Delaware and Lackawanna Company commenced legal proceedings to stop the work, obtained injunctions, etc., and, by resort to various legal quibbles, managed to delay the enterprise until the present time. The Hudson River Tunnel Company has, however, come off finally victorious, the injunctions are removed, and the construction is now to be proceeded with. It is understood that the wealthy Senator Jones, of Nevada, furnishes the capital, the estimated cost being ten to fifteen millions of dollars. The shaft on the Jersey side is to be carried down 65 feet. The horizontal tunnel under the river will then be commenced. The latter is to be 26 feet in diameter.

A NEW TEST COLOR.—The flowers of the violet and iris have recently been found to yield a very fine blue color, which is a more delicate test for acids and alkalis than the solution of litmus commonly employed. The name of the new color is phyllocyanin. It will probably before long find its way into all chemical laboratories.