

**The New English Patent Law.**

Writing upon the subject of the Patent Act, Mr. James J. Aston, Q.C.—perhaps the best legal authority on the matter—expresses the opinion that inventors have much cause to be grateful to the Government for passing the new act. Mr. Aston draws particular attention to one feature of the new law which has hitherto escaped notice, and which, in his opinion, constitutes an important benefit for inventors. Under the existing law a patent is granted upon the “express condition” that the nature of the invention, and in what manner the same is to be performed, shall have been described and ascertained by the inventor in his complete specification. This regulation throws the burden of proof upon the inventor, who has frequently been surprised to find that a description which he may have drawn up to the best of his ability has been held to be insufficient by the courts. Where this is the case the patent is voided. Under the new act, however, this condition is altogether omitted from the patent as draughted, and the complete specification will be filed before the granting of the patent, and will be approved by a competent officer before it is accepted and published. The new patent will further recite “that the inventor hath, by and in his complete specification, particularly described the nature of his invention.” Hence it would seem to follow, as Mr. Aston says, that the official acceptance of the specification carries the guarantee of its sufficiency; wherefore, in future, patents granted in the pre-

3. In order that the head may be kept up and the child prevented from poring over his books, a raised-desk and a form well adapted to his height should be provided. 4. The hours of work should be moderate; none should be done before breakfast. School hours should not be longer than from nine till twelve and from two till four, with perhaps an hour in the evening for preparation. 5. Active out door games—lawn tennis, fives, football, and cricket—should be encouraged. 6. The diet should be abundant and varied. 7. The bowels should be kept in order, and constipation avoided. 8. Appropriate glasses should be provided for viewing distant objects, and especially for following instruction on the blackboard, which many children wholly lose; but if the selection of glasses is not placed in the hands of an ophthalmic surgeon, it will be well to remember that in moderate myopia no glasses are required for near work, and that the feeblest glasses which give good vision for distance should be used.—*Henry Power, M.D.*

**AN AUSTRALIAN STEAM FERRY BOAT.**

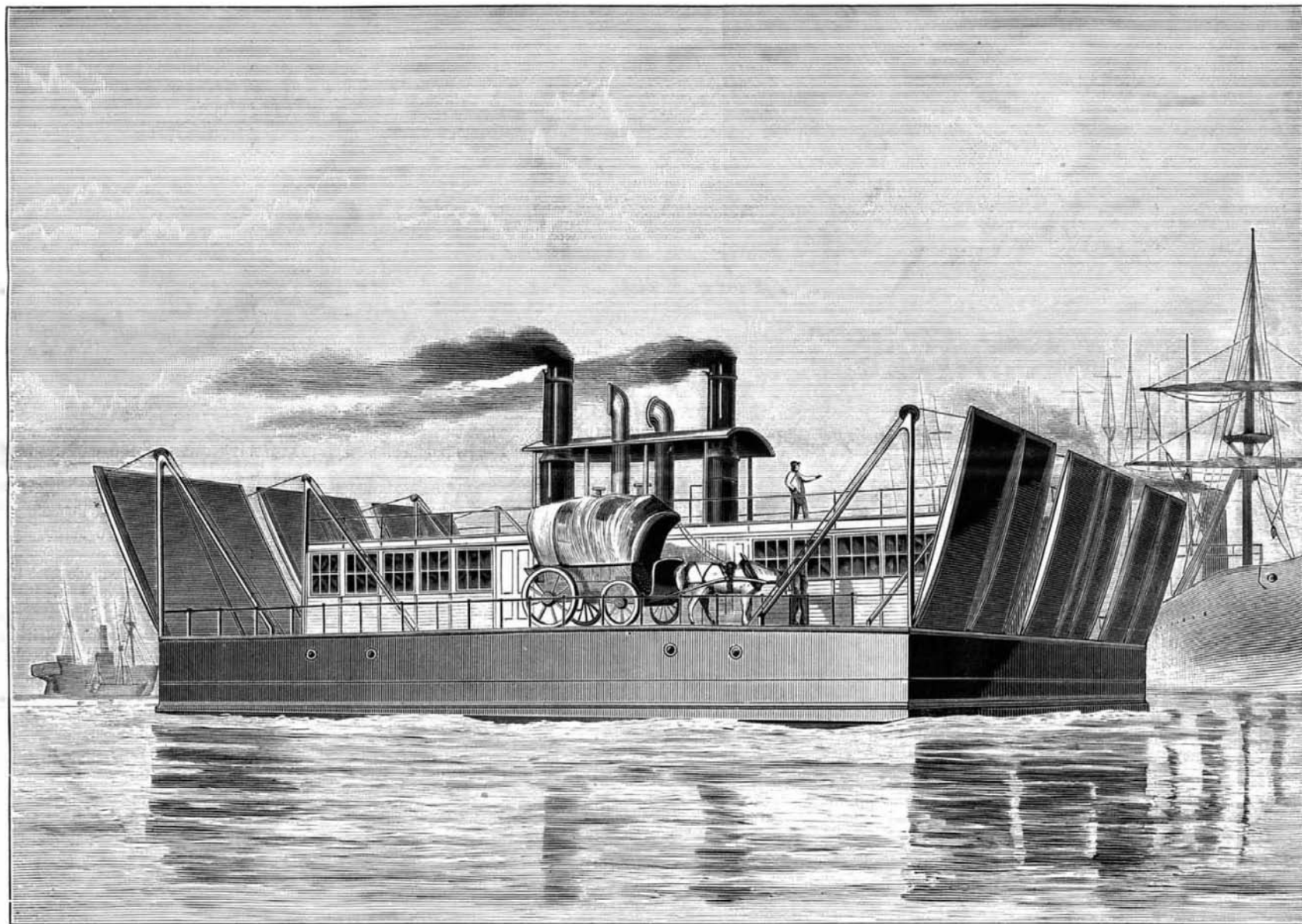
The increase of traffic between the north and south banks of the Yarra, at Melbourne, has now assumed such dimensions that the ordinary convenience afforded by the Falls bridge and the several ferry boats is entirely inadequate. From time to time the Harbor Trust has been urged to establish a steam ferry, and it now appears probable that the much needed reform will be accomplished. At the foot of Spencer

Street, Melbourne, Australia, a steam ferry is being constructed. The ferry, which will be square, both stem and stern, will be driven by powerful machinery, and will be of such beam that several loaded carts and wagons, irrespective of passengers, can be conveyed at once. The arrangements for entering and debarking will be such that horses will have no more difficulty than in crossing a bridge, and a wonderful convenience will thus be afforded to the public.—*Illustrated Adelaide News.*

fused to its bottom, or, better still, by placing the gold at the top of one limb of a U-shaped crucible, withdrawing test portions from the top end of the other limb, Mr. Chandler Roberts arrived at the diffusion rate, 300 millimeters in five minutes for silver, this rate being probably a little higher than that of gold. Sir William Thomson characterized this as a great discovery. The rate of diffusion of gold in lead, he said, appeared to be immensely greater than the rate of diffusion of liquids. The fact was, it was a subject of which we understood very little indeed, but which would probably prove of great value in metallurgy, where one example of it, the rapid mixture of spiegeleisen with iron, was well known. If the experiments were repeated with salt and water substituted for the gold and lead, it would take years, twenty years at least, to produce the result now attained in forty minutes, and which took place not much less rapidly than the diffusion of oxygen through hydrogen, or the transmission of heat through iron.

**Bone Black Superphosphate**

Prof. F. Farsky's conclusions are that superphosphate goes back in the soil the more rapidly the more calcium carbonate is present. The more water circulates in the soil, the less is the reversion. Superphosphate of a coarse texture is less liable to reversion than that of a fine grain. As most seeds complete their germination in the soil in seven to fourteen



**STEAM FERRY AT SPENCER STREET, MELBOURNE, AUSTRALIA.**

scribed form cannot be rendered void on this account. Mr. Aston writes in this case as an inventor; and, as such, he feels thankful for and greatly relieved by this change. Thus it would appear that the modified kind of inspection hereafter to be performed by the officials will be a greater protection to the inventor than was expected. We are not aware that Mr. Aston ever asked for an official guarantee of novelty, as did some fervid admirers of inventive genius; but protection against loss by inadvertence or ignorance of the necessities of accurate description is not too much to ask of the Patent Office. It must not be forgotten, however, that this conclusion is only the opinion of one lawyer (although an experienced one), and awaits confirmation by the court which first decides a disputed case of the nature indicated.—*Journal of Gas Lighting.*

**Nearsightedness.**

The points which should be insisted upon for the prevention of myopia, or for its arrest when it has commenced, are the following: 1. Work should always be done in a good light, and so far as may be possible by daylight; hence late hours, reading in bed, by twilight, and by firelight, should be discountenanced. 2. The type of the books in common use should be good. If two editions are printed, one with large and the other with small type, the former should be chosen. A few chapters may be detached and bound separately, so as to make a light book, easily held in the hand.

Street men are now engaged cutting out a miniature dock, from which the ferry will start, and on the other side of the river a similar excavation is in progress. The ferry, which will be square, both stem and stern, will be driven by powerful machinery, and will be of such beam that several loaded carts and wagons, irrespective of passengers, can be conveyed at once. The arrangements for entering and debarking will be such that horses will have no more difficulty than in crossing a bridge, and a wonderful convenience will thus be afforded to the public.—*Illustrated Adelaide News.*

**New Metallurgical Discovery.**

At a recent meeting of the British Association, Professor Chandler Roberts described some most suggestive experiments on the mobility of gold and silver in molten lead. Graham first ascertained the rate of diffusion of salts in solution; Dr. Guthrie has recently studied the diffusion in alloys; and Professor Roberts is now testing metals at temperatures above their melting points. If a lump of a gold-lead alloy with 30 per cent of gold, covered with lead, is heated in a crucible, the gold appears at the surface the very moment when perfect fusion has been attained; the diffusion also takes place rapidly if the gold alloy is put in a small crucible, and this one placed within another crucible containing lead. By melting in a cylinder, 200 millimeters high, a solid cylinder of lead with a small piece of the gold alloy

days, it appears that in lime soils plants obtain the phosphoric acid of their nourishment chiefly, if not entirely, from the calcium phosphate soluble in ammonium citrate. In an experimental field fine grained superphosphate gave a less advantageous result than coarser qualities. Kladno phosphate gave in three cases a better result than superphosphate, except with potatoes. Precipitated phosphate did not act as well as the other phosphates.—*Biedermann's Centralblatt.*

**The Dimensions of Atoms.**

In a recent lecture at the Royal Institution, by Sir William Thomson, on the size of atoms, the speaker, through a series of learned considerations which cannot be given here, reached the following conclusions: It is very probable that in an ordinary liquid, or a transparent or semi-opaque solid body, the mean distance between the centers of two contiguous molecules is less than one five-millionth of a centimeter and more than one-billionth of a centimeter. To obtain an idea of the grain and of the corresponding relative sizes, let us imagine a globe of glass or of water of the size of a croquet ball (16 centimeters in diameter), and let us increase it in imagination until it becomes as large as the earth, each molecule being increased in the same proportion. Then the structure of this mass thus increased would be more granular than that of a pile of musket balls, but certainly less so than that of a pile of croquet balls.—*La Nature.*



**Irrigation in India.**

The system of irrigation now in use in the Madras Presidency is on a vast scale, a record, though imperfect, of the tanks in 14 cultivated districts showing them to amount to 43,000 in repair and 10,000 out of repair, or 53,000 in all. The length of embankment required for each may be estimated on a moderate calculation at half a mile, and the number of masonry works in irrigation sluices, waste weirs, and the like may be taken to be at least six. The embankments alone for all these tanks would extend over 30,000 miles, while the total number of separate masonry works are at least 300,000. The most remarkable feature about this gigantic system is that it is entirely of native origin, not one new tank having been made by Europeans; and, according to all accounts, there must be a good many equally fine works which have been allowed to fall into decay. According to the *Tropical Agriculturist*, the revenue dependent on existing works is roughly estimated at 150 lakhs.

**Sulphur—Phosphorescent.**

K. Heumann raises the question whether sulphur, selenium, arsenic, etc., are not, under suitable circumstances, capable of phosphorescing like phosphorus. He finds that when sulphur is heated on a metal or porcelain plate in the dark, the vapors suddenly become phosphorescent, burn with a bluish-gray flame, perfectly distinct from the ordinary fine blue flame of sulphur. The odor given off is not that of sulphurous acid, but resembles that of hydrogen persulphide, camphor, and ozone. The product of the combustion is doubtless a stage of oxidation lower than sulphurous anhydride.

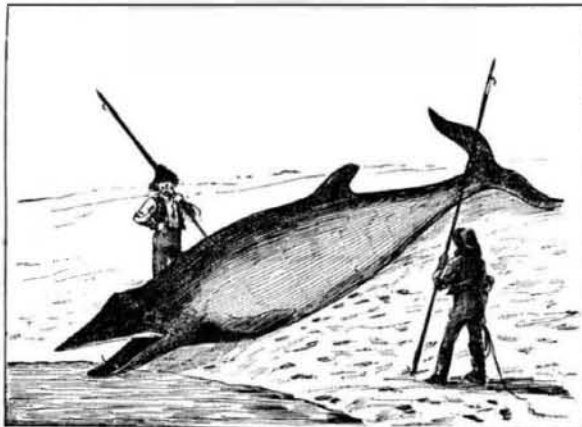
**KRAKATOA.**

We give herewith a sketch of the island of Krakatoa, in the Straits of Sunda, near the island of Java, which suddenly

low, managing to get his head seaward, went away at a great rate, sometimes below and sometimes on the surface; but he had been wounded mortally, and he was easily brought ashore again.—*Pall Mall Gazette*.

**THE BOTTLE-NOSED WHALE.**

A rare specimen of the Mesoplodon, or bottle-nosed whale, of which a picture can be seen on this page, was recently



**THE BOTTLE-NOSED WHALE.**

washed ashore near Long Branch. Professor True and Mr. Palmer of the Smithsonian Institution have taken a plaster cast and removed the bones to Washington. This is said to be the second specimen ever prepared. The only one now known is in the Paris Museum. The body is nineteen

disagreeable smell, suddenly rushed up the pipe, rising to a height of 43 feet above the surface. This left a heavy deposit, as it passed down the street, of dark gray sand, dead leaves, decayed wood, and nodules of iron. In a few days it became perfectly clear. In boring this well, an iron tube 4 inches in diameter was put down to a depth of about 100 feet, and inside this, gas pipes 2 inches in diameter were put down to the required depth. The uniform outflow of this well (the Borough well), shown in our cut, is 43,000 gallons daily, the whole of the cost of which, including tanks at which water carters can fill their casks, troughs for watering of horses and cattle, pipes for channels, etc., was only £280 16s., whereas the estimated cost of supplying Sale with water from a higher level of the river, by gravitation, was estimated at £36,000.

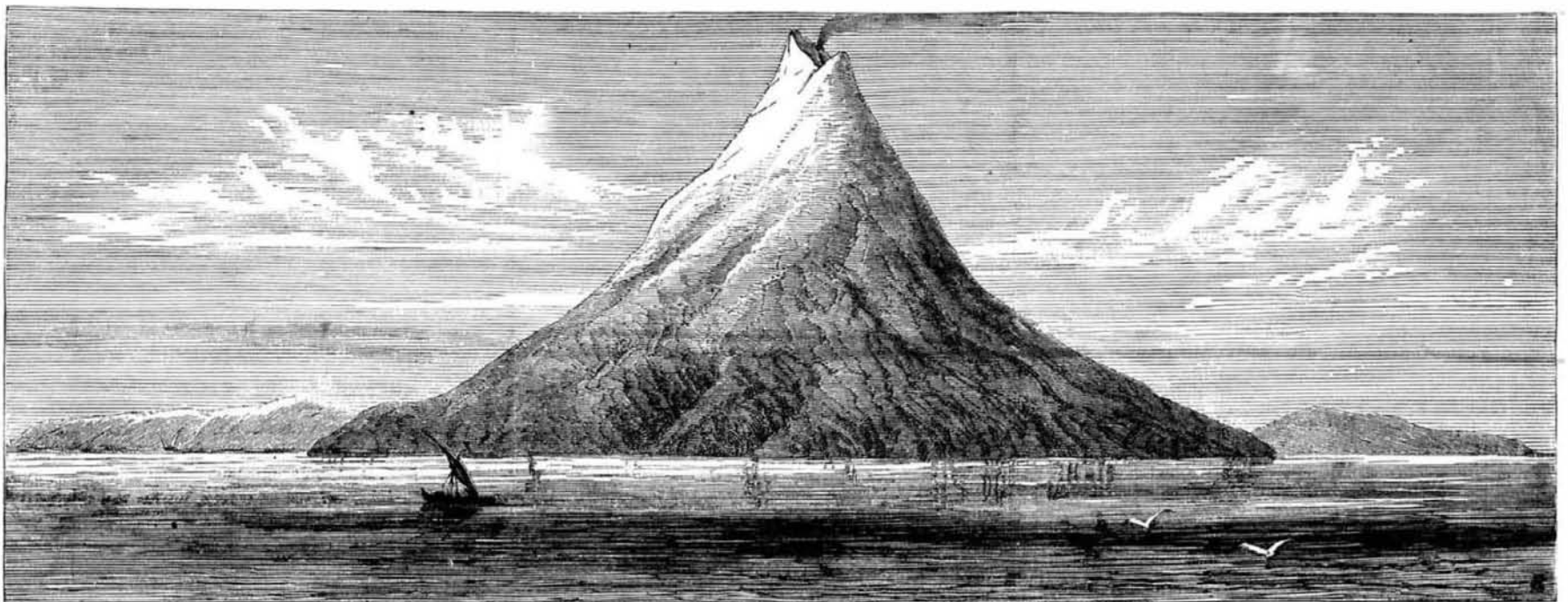
The following is the analysis of the water made by Mr. Cosmo Newbery. It is bright, colorless, and tasteless; it contains an amount of solid matter in solution equal to 30.7 grains per gallon.

An analysis of this gave:

Chloride of sodium.....	36.44
"    potassium.....	trace.
"    calcium.....	"
"    magnesium.....	0.46
Carbonate.....	0.40
of calcium.....	trace.
"    silica.....	0.80
Organic matter.....	1.60
Total.....	39.70

In one million parts it contains free ammonia, 0.75; albuminoid ammonia, none; nitrates and nitrites, none. The water is of excellent quality for all domestic purposes, and it is remarkably free from nitrogenous bodies.

Most of the ground bored through was soft; samples of the various strata passed through were religiously preserved



**THE ISLAND OF KRAKATOA, FORMERLY IN THE STRAITS OF SUNDA, SUBMERGED DURING THE LATE VOLCANIC ERUPTION IN JAVA.**

disappeared during the terrible earthquakes of August 25th and 26th last. A large area of habitable territory was submerged during this extraordinary convulsion of nature. One hundred thousand people lost their lives, most of them being overtaken by the great waves which came from the sea, and swept inland for several miles. Our engraving is from the *Illustrated London News*.

**Death from Passion.**

Cases in which death results from the physical excitement consequent on mental passion are, according to the *Lancet*, not uncommon. A recent instance has again called attention to the matter. Unfortunately, those persons who are prone to sudden and overwhelming outbursts of ill temper do not, as a rule, recognize their propensity or realize the perils to which it exposes them; while the stupid idea that such deaths as occur in passion, and which are directly caused by it, ought to be ascribed to "the visitation of God," tends to divert attention from the common sense lesson which such deaths should teach. It is most unwise to allow the mind to excite the brain and body to such extent as to endanger life itself. We do not sufficiently appreciate the need and value of mental discipline as a corrective of bad habits and a preventive of disturbances by which happiness, and life itself, are too often jeopardized.

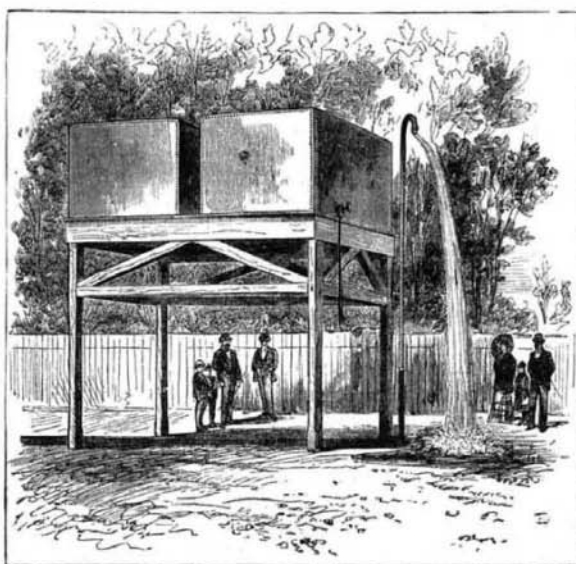
**A Whale Hunt in Shetland.**

At West Voe, Dunrossness, on September 20, early in the morning, a number of six oared boats were proceeding to the fishing, when they observed a shoal of whales (twenty-eight in number) disporting themselves close to Sumburgh Head. They immediately gave chase, and succeeded in driving them all ashore. The scene of slaughter was wild in the extreme. Along the head of the Voe were spread the whales, lashing the water into foam in their death struggles, while in the midst of the blood and foam the men, wading waist deep in water, were going from fish to fish and plunging lances into the monsters' sides. One big fel-

feet and four inches long and will probably weigh two tons.—*Graphic*.

**ARTESIAN WELLS, AUSTRALIA.**

There are two artesian wells at Sale, known respectively as the Borough and the Cunningham Street well. On the



**ARTESIAN WELL SALE, AUSTRALIA.**

15th of April, 1880, a contract to bore 300 feet, or until the water flowed over the surface, was taken by a German called Niemann, the borough council of Sale, after considerable discussion, having voted a sum of £200 for the purpose. Water which rose 3 feet above the ground was struck on June 17, at a depth of 190 feet; and on sinking some 40 feet deeper, a stream of black water, with a most

and placed in their order, in a long box with a glass front, and were thus sent to the Mining Court of the Melbourne Exhibition.

Water was struck in the Cunningham Street well, which is the property of a private company, on the 25th August, 1882. Two water bearing strata have been tapped here, one at the depth of 190 feet with a 6 inch pipe, the other at 284 feet with a 4½ inch pipe, placed inside the former. The supply of water from the 190 foot level is 250,000 gallons, and that from the 284 foot level 150,000 gallons a day, making in all the immense outflow, rising 40 feet above the surface, of 400,000 gallons a day, of which at present about 380,000 gallons are wasted. This runs through the street into Wishart's Morass, thence into Flooding Creek, and and thence into the Heart Morass, where it floods a lot of selections for a distance of over six miles. It is, however, anticipated that at some future period this water will be used as a motive power. The water from the lower level is kept back by means of cocks. The cost of this well was £1,250; during the process of boring, several accidents in connection with the machinery occurred, usually causing the operation to end in failure.

According to Mr. Johnson, Government Analyst, the water from the above well shows only six grains of salt to the gallon, as against 36 grains in that of the Borough well, not a quarter of a mile distant. The water from this latter is said to have proved unsuitable for reticulation purposes, as it not only rots the pipes, but also stops them up with sesquioxide of iron, so that they have to be taken up and cleaned at short intervals; that from the Cunningham Street well, on the other hand, so far from being injurious to iron, is actually said to be improving the boilers of the locomotives in which it is used, and to have been running through 1 inch and 1½ inch pipes for the last four or five months without any sign of injury. The borough council of Sale is talking of reticulating the town, but has not yet decided whether to use the Cunningham Street well or to risk putting down another.—*Town and Country*.