



Hydrogen Gas.

Water is a compound of two bodies which exist naturally in the state of gas; the one is hydrogen and the other oxygen. If we introduce into a bottle one ounce of clean iron filings and pour upon them a mixture of sulphuric acid, in the proportion of one of acid to six of water cautiously, hydrogen gas will be evolved in great quantities.

EXPLANATION.—The iron filings do not make nor give out the hydrogen, nor the acid, but the water. The oxygen of the water leaves the hydrogen and becomes incorporated with the iron, forming the oxide of iron. The gas may be caught in a receiver, on the pneumatic trough. The use of the acid is to act upon the iron so that a clean surface may always be exposed to the oxygen of the water. The residue of this experiment may be vaporized and the crystals formed will be the sulphate of iron—common copperas,—a drug used in stomachics by the physician, and much used by the dyer for making blues on cotton and for making variations in the shades of different browns. It is also the basis of blacks

On the difference which exists between Gilding by the use of Mercury and Electro-Gilding.

We have been frequently called upon to solve the following question,—viz. “By what means had a certain article of copper or silver been gilded?” This could not possibly be ascertained with certainty by mere inspection, even by the most experienced eye. M. Barral has, however, discovered a certain means of ascertaining the fact by chemical reaction. He has found that by attacking the articles to be tested with dilute nitric acid, either warm or cold, pellicles of gold are obtained, of the exact form of the article; provided the acid be not allowed to act too energetically. These pellicles are of a yellow gold colour on both sides when obtained from articles gilded by simple immersion in an alkaline solution of gold, or by means of the galvanic current decomposing certain solutions. On the contrary, the pellicles produced on the surfaces of articles gilded by mercury are of a reddish brown color on the side next the surfaces of the articles gilded. In order to explain this difference in the appearance of the pellicles of gold, M. Barral first had certain articles gilded by the mercury process with certain quantities of gold. The articles thus gilded, on being acted upon by dilute nitric acid, furnished pellicles of gold of a deep brown color on their inner faces, and heavier than the gold originally employed in the gilding process. The pellicles not dissolved by the acid were therefore not pure gold. They were proved by direct analysis to contain about three per cent of copper or silver, according to which of these two substances the gilded article was formed. M. Barral, therefore, considers it evident that when the amalgam of gold is applied to the surface of an article, a double amalgam of gold and copper or silver is formed. If the article be then submitted to heat, the mercury will be volatilized, and an alloy will be formed, thereby uniting the precious metal and the metal of which the article is formed. If the article gilded be then acted upon by the nitric acid, the metal of which it is formed will be completely dissolved, and the acid will act upon the alloy, and carry off the copper or silver near the inner surface, where the gold is in small quantity. But, as the proportion of gold increases near the outer surface, it will preserve the other metal from dissolution, as is well known to be the case with all alloys in which gold predominates. It will, therefore, be understood, that the pellicles detached from the articles gilded with mercury must be covered on their inner surface, after being acted on by the nitric acid, with a very thin layer of gold, which gives it a brown color; this will also explain the reason why nitric acid leaves the gold in an impure state after the destruction of the

base metal of the articles. When an article to be tested has been gilded by electro-chemical means, it will be found that the pellicle of gold covers the copper or silver, without amalgamating therewith; and therefore, the nitric acid act upon the layer of gold. The foregoing explanation proves the new methods of gilding to be less solid than the old ones; for it is evident that a layer merely laid on like a coat of paint, cannot adhere so tenaciously as when the metals are to a certain extent incorporated. Experience has proved, however, that the processes of electro-gilding and gilding by simple immersion possess certain advantages over the old methods. The pellicle obtained by from the gilding by mercury, when held up to the light, presents an appearance of being perforated with numerous fine holes; this effect is produced by the passage of the mercury through the gilding when driven off by evaporation. Layers of gold deposited by a battery or by immersion are, however, perfect coatings; and, consequently, for domestic purposes—especially for vessels intended to come in contact with acids—copper articles, gilded by the mercury process, possess disadvantages which are obviated entirely by the new process.

Natural Gas Jets.

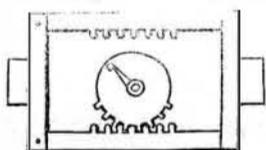
We learn from Chambers Edinburgh Journal that at the village of Wigmore in Herefordshire, there are fields which may be, and two houses which are, lit up with a natural gas. This vapor, with which the subjacent strata seems to be charged, is obtained in the following manner;—A hole is made in the cellar of the house, or other locality, with an iron rod; a hollow tube is then placed therein, fitted with a burner similar to those used for ordinary gas lights, and immediately on applying a flame to the jet, a soft and brilliant light is obtained, which may be kept burning at pleasure. The gas is very pure, quite free from any offensive smell, and does not stain the ceilings, as is generally the case with the manufactured article. Besides lighting rooms, &c., it has been used for cooking; and indeed seems capable of the same applications as prepared carburetted hydrogen. There are several fields in which this phenomenon exists, and children are seen boring holes, and setting the gas alight for amusement. It is now about twelve months since the discovery was made; and a great many of the curious have visited, and still continue to visit the spot.

Powder Detonating with a Purple Light.

Boil four parts of nitric acid on one part of indigo: the solution becomes yellow, and a resinous matter appears on the surface. Stop the boiling; let it cool: remove the resinous matter, and gently evaporate the solution to the consistency of honey. Re-dissolve it in hot water; filter; a solution of potash will throw down yellow spicular crystals consisting of bitter principle, combined with potash. These crystals have the curious power of detonating with a purple light when wrapped in paper and struck by the hammer. The resin by being treated again with nitric acid, is converted into the same bitter principle.

MECHANICAL MOVEMENTS.

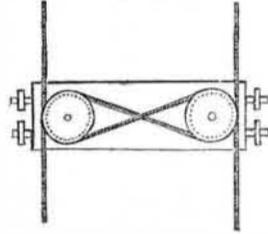
Traverse Motion.



The application of eccentrics is one of the most beautiful, although one of the most difficult parts connected with mechanism, to learn. The movement of heavy carriages for the purpose of turning heavy shafts by moving steadily in one direction and then returning, continually going through the same operation, was long a desired object and its accomplishment was the result of an acquaintance with the principle exemplified in the above cut. In the centre of the rack carriage is a wheel notched on the radius, and as it moves the carriage moves in one direction till the notched radius clears the rack of the carriage, when the upper rack is caught by the wheel and another movement given to the carriage. Every revolution of the wheel gives a forward and backward movement to the carri-

age. The cradle of a sawmill is built upon this principle, and although different variations of machinery may produce the same result, yet the principle of the motion is here very beautiful, because very simply, explained. While the wheel has a circular motion the rack moves horizontally backwards and forwards. The change of the motion of the one is by an arrangement of the other, simply by notching the radius of the wheel instead of the circumference.

Carriage Guide.



The above cut represents a method of keeping the carriage of any machinery parallel, and is effected by passing bands over the loose pulleys seen at either extremity of the carriage, so that the band which goes from the low corner of the figure, is the same as that seen at the top, and the reverse; thus as the carriage is moved backward or forward on the wheels which support it, it is prevented by this arrangement from ever going faster at one end than the other.

The Gold Room in Windsor Castle.

The whole collection in what is called the Gold Room at Windsor Castle is valued at twelve millions of dollars! There are glass cases like a silversmith's shop, and behind the glass are the principal articles. There is a dinner service of silver gilt of the most gorgeous kind, presented by the merchants of Liverpool, to the late William the Fourth, long before he was king, in reward for his advocacy of the slave trade! with the inscription telling the tale. There is a salver of immense size, made from the gold snuff boxes alone, of George the Fourth,—the lids and inscriptions curious preserved on the surface in a kind of mosaic of gold; its value is fifty thousand dollars. Nell Gwynn's bellows—the handles, nozzles, &c. of gold!—the golden peacock inlaid with diamonds, and rubies from Delhi—not as large as a pheasant, but valued at one hundred and fifty thousand dollars; the footstool of Tippoo Saib, a solid gold lion with chrystal eyes, the value of its gold alone seventy thousand dollars; George the Fourth's celebrated golden candelabra for a dinner table, valued at fifty thousand dollars, so heavy that two men are required to lift each. Piles upon piles of golden plates, sufficient to dine two hundred and fifty persons, with ample changes. There are 140 dozen each of gold knives and forks of various patterns, and 141 dozen each of gold table and tea spoons, all arranged in the most perfect order, and glass cases on tables in the middle of the room filled with gorgeous gold. From the contemplation of all this memory only carries away a confused idea of riches, such as must have cost poor underground laborers, lives of toil, and sweat, and pain, to procure. A simple fact in connection with this gorgeous display will serve to illustrate its worth to one at least of its royal possessors, George the Fourth, whose sense of taste became so vitiated that although his meat was set before him in golden dishes he was obliged to season it with assafoetida to make it anything but tasteless.

The Telegraph among the Turks.

A letter from Constantinople states that Dr. Smith, of South Carolina, chemist and geologist to the Sultan, has procured a complete set of the magnetic telegraph apparatus used by Professor Morse, and presented it to his Majesty. The system of Prof. M. was fully explained to the Sultan by Dr. S. and Hamilton, an American missionary, who has charge of a seminary for young men on the banks of the Bosphorus. The Sultan was delighted, and is said to have decreed to Prof. Morse a diploma in the Turkish language, and a diamond decoration.

Mercury for thermometers is purified by agitation in a bottle with sand, and then by straining it through leather.

To Boil Shad.

All the small bones in a shad may be made perfectly soft so as to be masticated without any difficulty by boiling it smartly forty or 8 hours. The fish of course should be kept up tightly in a cotton cloth so as to prevent its falling to pieces. The palatableness of the fish is said to be in no degree lessened by this mode of treatment. One who has witnessed this with more senses than one vouches for the accuracy of the above.

Watches.

Watches, remarkable for their extreme thinness, are now manufactured at Geneva. They are not thicker than a line and the sixteenth part of a line—little more than the 12th of an inch. This change does not, however, militate against the full play of the movement for that remains the same, the thinness being obtained by placing the hands at the side instead of over the works. This arrangement makes the watches rather larger in circumference.

Making Gold.

It is a singular fact that Sir Humphrey Davy the great chemist, declared the search for the philosopher's stone not so visionary as generally supposed. He considered it possible that the secret of making gold should yet be discovered, though he doubted whether it could be turned to a lucrative purpose.

Steamboat Signals.

The Admiralty in England having notified that they intended to adopt a green light instead of the usual self-colored light, for steamers, some of the steam packet companies objected to the change, and being furnished with the green light, tested it with the red and natural colored lights, and the trial resulted in the utter condemnation of the Admiralty green light. The three lights were placed in a line on the coast some miles distant, the green appearing far more distant as well as far less distinct than the rest.

The human body in a healthy state is generally at 98° Fahrenheit.

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