MISCELLANEOUS INVENTIONS.

Friction and percussion tubes have been made for insertion in the vent holes of cannon to fire them; but, as is well known, the vent becomes enlarged by use, so that the tubes fit loosely, and either blow out without igniting the charge in the cannon, or else the tubes break off below the firing wire, on account of not being firmly held. Mr. John B. Rodman, of Fort Brown, Texas, has patented a primer for cannon which holds the priming tubes securely, and thus insures their proper operation.

A device for removing old caps from and inserting new caps in cartridge shells which have been exploded, has been patented by Mr. Heber W. Harrington, of Fort Dodge, Ia. The invention is also adapted to be used in capping new shells. It consists in a novel construction and combination of a tubular plug and a punch or piston working therein, the details of which cannot be clearly described without engravings.

It is well known that in the burning of factories, hotels, and private dwellings serious injury to the person and loss of life are of frequent occurrence because of persons jumping from windows. Mr. Thomas Bickerton, of Lawrence, Kan., has patented a device designed to prevent the occurrence of such accidents. It consists of a frame lined on sides and ends with mattresses, and having a movable bottom consisting of a mattress suspended by elastic cords.

An improved vise that may be easily operated by the foot of the workman to forcibly clamp the jaws of the vise upon the work while the hands are free to hold the work has been patented by Mr. William S. Lord, of Brownsville, Tenn. It may be immediately adjusted to adapt the jaws to embrace the work before the clamping movement of the jaws is exerted.

An improved grate for stoves and furnaces has been patented by Mr. Isaac Hayes, of Philadelphia, Pa. The invention consists in a grate composed of cross bearers that are fitted for being rocked and support the grate bars. The bearers are moved by a rock lever and handle that is connected with two of the grate bars, whereby the bearers and grate bars are vibrated alternately in opposite directions.

Hygiene of Photography.

At a recent convention of Photographers at Chicago, Dr. Norman L. Briggs, of Rush Medical College, was announced to read a paper on "Poisons of Photography." He gave instead a brief practical address on the hygiene of photography, in which he said that photography, though not an ideal occupation, could not be an unhealthy one. An ideal occupation was one that required one to indulge in a variety of muscular motions. There were very few occupations ideal; one man labored with his hands, another with his legs; another was exposed to gases, and another to dust, the latter, by inhalation, producing lung diseases; still another class, such as people who work in gas works, was exposed to high temperatures, while yet another class, who work with their feet in the water, caught cold and were attacked with rheumatism, Bright's disease of the kidneys, etc. Photography was an occupation conducive to good health, as it required a great variety of motion, and was of the lighter occupations. It also dealt with the mind, being an artistic employment. There were certain chemicals photographers used that were detrimental to health, and there were a number of gases and solid substances that photographers were compelled to come in contact with. Among the fumes they inhaled were those of alcohol and ether. The latter was a stimulant to the animal body, and the effect was detrimental, many of the nervous disturbances being attributable to it. The vapor of alcohol was no more harmful than if taken in the stomach, and was as great. Acetic acid vapors were harmful if one was exposed to them a great deal, but the amount of fumes of that drug that photographers were exposed to was small. The fumes of hydrocyanic acid were exceedingly harmful, as well as those of iodine and bromide, these latter causing a sallowness of the complexion and producing eruptions of the skin. But those fumes were rare.

The solids that photographers came in contact with were exceedingly harmful, notably nitrate of silver, in the solution of which photographers put their hands. The absorption was slight, but they got some silver in their systems. Physicians found it valuable in some diseases. It produced symptoms of general debility; the patient looked sour, digestion was bad, the tongue coated, secretions sluggish, and the person was generally ill. They should avoid it as much as possible. Iodide of potassium solutions were slightly harmful, and bichromate of potassium was exceedingly harmful, producing irritation of the mucous membrane. Persons who manipulated that drug had eruptions of the skin and irritation of the mucous membrane—ulceration of the latter, etc. No person could work with it without ulceration of the bronchial tubes.

Another solid substance was cyanide of potassium, used for cosmetic effect—for the removal of stains from the hands. This drug would do more harm than the silver would.

The question was: How could they avoid injury? In acute poisoning something might be done in the direction of an antidote, but not generally as much as was supposed. Little could be done in the shape of antidotes in cases of chronic poisoning, which produced symptoms of nervous prostration, loss of sense of hearing, and fading of the sight.

Chloride of gold and sodium were harmless, and pyrogallic acid was harmful if it came in contact with certain parts of the body. What were the measures that could be employed to remove the injuries caused by those poisons? The first thing to do was to avoid getting those poisons in the system. The gases might be rendered innocuous by dilution, which could be done by atmospheric air. It was possible to ventilate photographers' dark rooms well without interfering with their work. They should have several small openings in the apartments. A tallow candle or a small kerosene lamp, placed in a little flue so that it would cause the air to pass up would ventilate a room. By diluting the gases the photographer would cease to inhale them.

About the solids: He knew but one way to obviate their effects, and that was to avoid touching them, or, if they did it should be done with protected hands. The doctor thought tongs or forceps could be used to put the plates in solutions. He advised photographers to take less of stimulants while they were inhaling other stimulants. That brought forth laughter and applause from the delegates, and Dr. Briggs said he meant alcoholic stimulants to some degree. They should, he said, eschew tea, coffee, and tobacco; they could not take one stimulant to kill another, and should avoid as far as possible taking in the stomach all unnatural things. They should also avoid all strong stimulating condiments, such as cayenne pepper, etc. The photographer might indulge in athletic sports—play base ball, swing Indian clubs, or use the health lift. He should be out of doors as much as possible. He might indulge in a little free exercise, and a little medication might be allowed. He should avoid contact with and dilute the poisons; get good recreation and avoid the overuse of stimulants. The speaker believed the profession of photography ought to be as healthy as any in the land. He knew that photographers as a rule were chemists, and as years went by chemistry was being more and more studied by them. The danger from poisoning would grow less as years passed by.

Hunting for Submarine Treasure.

A schooner, owned by a Connecticut "Submarine Company," is being used in exploring a sunken wreck off Round Island, near Peekskill, on the Hudson. The wreck has been there many years, and is reputed to have been the ship of the famous pirate Capt. Kidd. A visitor found among the appliances of the schooner a great variety of machines, chains, pumps, rubber tubes, and other contrivances, for bringing treasure out of deep water. Chief among these was a large diving bell, of boiler iron, with little round windows on every side, so that the man inside can see out in every direction—up, down, and across. It is kept in a well in the hold, and when it is to be used, bolts at the top are unfastened, the man climbs in, and the bolts are again fastened, the top being put on so tight that the affair is both air and water proof. The sensation of being bolted into this narrow iron prison for the first time is said to be terrible, though the experienced divers do not mind it. There are two rubber tubes attached to the top, one to carry off the exhausted air, the other to supply fresh air. When the man is fastened in, the air pump is started, and the bell is hoisted out with an immense derrick and lowered over the side. This bell can operate in 300 feet of water, and is, of course, raised or lowered by steam. When all is ready it is lowered to the bottom. The man inside looks through his windows, and determines what must be done first. He has wires to pull to signal the men above. He can tell them to hoist, lower, give him more or less air, or any other signals that may have been agreed upon. Attached to the side of the diving bell, and operated by steam, from above, is what is called "the arm"—a heavy attachment, provided with so many joints and swivels that it is capable of making all the many motions of the human arm, with much greater strength than any human arm ever had. This arm has a hand, with fingers, that hold a saw, an axe, a crowbar, or any instrument desired. If the man in the bell desires to saw, he is drawn up, a saw is put in the steam hand, and he goes back and begins work. When he wants an axe or a hammer he is drawn up again, and the tool is changed. The iron bell is almost human in its capacity for work, and, with the brains of a man inside, it is a valuable laborer. When the work is in very deep or dark water, or at night, an electric light is attached to the bell, and the bottom for many yards around is made as bright as if the sun shone upon it. The effect upon the surface of the water of this bright light underneath is said to be dazzling and beautiful, and some of the Rip Van Winklites who live up yonder on the hills may well begin to wonder when they see the bottom of the Hudson bright with electric light and a steamman digging for a pirate's treasures.

Energy Developed during Rains.

Professor Tait, of Edinburgh, thus illustrates the gigantic scale upon which nature performs some of the most ordinary of her operations: Suppose a mere tenth of an inch of rain to fall from the lowest mile of the atmosphere. An inch of rain is 5 pounds of water to the square foot, and gives out, on being condensed from vapor, approximately, 3,000 units of heat, on the Centigrade scale. The mass of the mile-high column of air, a square foot in section, is about 360 pounds, and its specific heat about a quarter that of water. Thus, its temperature throughout would be raised by about 33° Centigrade, or 60° Fahrenheit. For one-tenth of an inch of rain, therefore, we should have a rise of temperature of the lowest mile of the atmosphere amounting to 3·3° Centigrade—quite enough to produce a very powerful ascending current. As the air ascends and expands it cools, and more vapor is precipitated, so that the ascending current is further accelerated. The heat developed over one square foot of the earth's surface under these conditions is equivalent to work at the rate of a horse power for 12 minutes. Over a square mile this would be 10,000,000 horse power for half an hour. A fall of one-tenth of an inch of rain over the whole of Great Britain gives heat equivalent to the work of a million millions of horses for half an hour! Numbers like these are altogether beyond our comprehension. They enable us, however, to see the full explanation of the energy of the most violent hurricanes in the simplest physical concomitants of the mere condensation of aqueous vapor.

Patents and Science.

A paper was read at the late meeting of the American Association by Mr. B. S. Hedrick, Examiner at the Patent Office, Washington, D. C., on "Patent Laws as a Means for the Advancement of Science." The proper aim of science was defined to be the making of discoveries. The discoverer of a new mineral, a new plant, a new law in nature, or a new world, has no proprietary right in his discovery. The honor and distinction he obtains is his reward. A discovery, then, cannot be the subject of a patent. The laws of nature, the properties of matter, the physical forces, and the laws of their generation and government, are, like the earth, the air, and the water, the common property of all. Property in the former, as in the latter, is created by enactments. But in civilized communities the reason for the law is that something has been added to what was given by nature. The land has been fenced, plowed, and planted, or buildings placed upon it that give the foundation for proprietary right. And public policy requires that this right be recognized; and civil, municipal, and common law does this in the case of the land, the air, and the water. Patent laws do the same when discoveries, the properties of matter, forces, the laws which govern them, are made to take the shape of useful invention. The invention which the inventor created is secured to him as his property for a period at least. But not the laws themselves. It is the reflex action of the invention that promotes the advancement of science. Illustrations were given by referring to Watt's steam engine in advancing our knowledge of the laws of heat; the telegraph, in giving a new development to the science of magnetism and electricity; and now the telephone and other kindred inventions serve to push our knowledge into the farthest and outermost borders. The protection given by patent laws enables the great host of investigators to carry on their researches, and, instead of becoming a tax and burden to the community, they help both themselves and others to bear a full share of the ordinary burdens of society. Reference was made to Wheatstone, Bessemer, the brothers Siemens, Perkin, Graebe, Sir William Thomson, and others in Europe, and to Morse, Page, Henry, Gale, Bell, Edison, and many others, members of the American Association—men who have greatly advanced science, and have received of the rewards which flow from the operation of patent laws.

Young Rats Tied by their Tails.

A correspondent writing from Richmond, Va., wants to know if it is the custom of rats to tie up their offspring by their tails. He lately found "four young rats, each one neatly tied around the left hind leg with his own or his sister's or brother's tail, and all tied together at a common center and neatly interwoven, on a fabric of downy feathers which composed their nest." Our correspondent will find an engraving of rats tied in this manner, with an explanation of the matter, in SCIENTIFIC AMERICAN SUPPLEMENT. No. 234.

Subcutaneous Injection of Ether in Sciatica.

Dr. Comegys, in *L'Union Médicale*, recommends hypodermic injection of sulphuric ether for the treatment of sciatica. He cites two cases, one in detail, which he has cured by this plan. Three drops of ether are injected at intervals of twelve hours. The injection need not be a deep one; and though it causes a momentary sharp pain, it does not bring on any consecutive unpleasant effects. Dr. Comegys is inclined to think that the same injection might be successful in the case of tic-douloureux, for which Dr. Marino recommends hypodermic injection of ergotine.

Tasteless Cod Liver Oil.

Dr. Peuteves, in *La France Médicale*, recommends, in order to render cod liver oil tasteless, to mix a tablespoonful of it intimately with the yolk of an egg, add a few drops of essence of peppermint, and half a tumbler of sugared water, so as to obtain a *lait du poule*. By this means the taste and characteristic odor of the oil are entirely covered, and the patients take it without the slightest repugnance. Besides, the oil, being thus rendered miscible as the water in all its proportions, is in as complete state of emulsion as the fats at the moment they penetrate the chyle vessels, consequently absorption is better assured.

The Utilization of Saw Dust.

The saw dust, which has become such a nuisance at Minneapolis and along the river below that growing city, offers a promising field of enterprise for whoever will utilize it. Several applications have already been made of it, and now arrangements are being made by a French manufacturing chemist for the establishment, at Minneapolis, of a laboratory to make from the saw dust an acid, now imported from France, and largely used by dyers, chemists, and druggists. It is to be hoped that the enterprise will be successful.