Cremation.

BY DR. SAMUEL KNEELAND.

The four principal ways of disposing of the dead have been: First, mummification; second, burning; third, interment; fourth, aerial exposure. Of the first, practiced chiefly by the ancient Egyptians, and of the fourth, by many savage nations, I need say nothing at this time.

In most nations, savage and civilized, from time immemorial, it has been the custom to inter the bodies of the dead in the ground, or to seal them up more or less tightly in tombs. Though these may answer all sanitary purposes, and fulfill all the sacred obligations of the living to the departed, in scattered populations, they are attended with danger, always increasing in populous communities.

This danger has practically been recognized by the fact that cemeteries have generally been placed without the limits of thickly inhabited districts. When persons, dead from infectious diseases, are buried in graves, they leave behind them to the public, as residuary legatees, a fearful amount of danger; and faithfully and impartially is the deadly legacy divided among all dwelling within a circle of one thousand to three thousand feet of such graves. Earth will, to a certain extent, deodorize, but cannot destroy or impede the escape of minute poisonous germs.

The danger from this source has never been fully appreciated by the public, entirely ignorant of the process of decomposition, and the products thereof. Of course, the decay of the body committed to the grave depends as to rapidity entirely on the soil and temperature. In the Arctic regions decomposition is imperceptibly slow; in dry, torrid sands desiccation takes the place of putrefaction, and a kind of natural mummification takes place. In low, damp, or wet soils, in temperate zones, decay may be complete in one to one and one-half years, giving off deleterious gases for that length of time, with perhaps the seeds of contagious disease. In dry, high, and airy soils the process is much slower and less dangerous.

What is decomposition of the human body? What are its products? What its dangers?

An English writer has defined the human body, chemically, as 45 pounds of carbon and nitrogen dissolved in 5½ pailfuls of water. Oxygen, though the principle of life, is also the great destroyer; the moment life ceases, our carbon by its agency is converted into carbonic acid, which escapes into the air, or is taken up by the roots of plants, according to the mode of sepulture; our nitrogen combines with some of the hydrogen of decomposition, forming ammonia, which escapes in a similar way; the water which forms about two-thirds of our weight is lost by evaporation. We are resolved, therefore, into gases, and the only dust which remains behind is the four or five pounds of lime salts which constitute our bones and hard parts. Nature provides sufficient animate and inanimate agents for the removal of decaying animal substances in the air, on the ground, or just beneath its surface, and the more speedy in the hot and damp climates where the results of decomposition are the most deleterious, provided man in his folly do not interfere with her processes. Man, by his mode of interring human bodies, contrives to prolong as much as possible the decay of his deceased brethren, thereby increasing to the utmost the possibility of poisoning the air, infecting the earth, and contaminating the water in the neighborhood of living beings. Air and surface burial permit free access to the myriads of minute living creatures whose office it is to convert into their own harmless substance the bodies of dead animals and man.

In the grave of six feet or more in depth light and air are in great measure excluded, and there is no access to the insects from whose eggs emerge the grubs or worms, from whose jaws popular belief expects the rapid and total destruction of the body. The truth is that the devouring worm is a myth, as much without foundation as the "dust" into which we are supposed to be resolved, and the results of decomposition are horrible enough in reality without adding any imaginary sensational accessories.

The modern process of cremation is performed as follows: The crematory at Washington, Pa., is a brick structure one story high, thirty feet long, twenty feet wide, divided into two rooms, a reception room twenty feet square, including walls, and a furnace room twenty feet by ten feet, including walls. Cremation is performed in a fire clay retort, such as is used in the manufacture of illuminating gas, but of a somewhat different shape, heated to a red heat before the body is introduced, which work requires about twenty-four hours. The body is placed in an iron crib made in the shape of a coffin, with small round rods, with feet three or four inches long to keep it up off the bottom of the retort. These feet are inserted into a flat strip of iron two inches wide and a quarter inch thick, turned up at the ends so that the crib with the body will slide into the retort easily. In addition to the ordinary burial garments, the body is covered with a cloth wet with a saturated solution of sulphate of aluminum (common alum), which, even when burned, retains its form, and prevents any part of the corpse from being seen until the bony skeleton begins to crumble down. During the cremation there is no odor or smoke from the consuming body, as the furnace is a self-consumer of smoke and other vaporable matter. The time required to complete the operation is about two hours, but improvements in the process will doubtless shorten the time. A very small portion of the remains is ashes, but the mass is in the form of calcined bones in small fragments, very white, odorless, deprived of animal matter, and may be preserved any length of time without change.

There are four to seven pounds of these remains from various sized adult bodies; they can be placed, for preservation, in a one-gallon druggist's bottle, with large ground stopper, into which a photograph of the deceased, with appropriate record, can be placed before introducing the remains. This bottle can be placed in the *columbarium* of the crematory, kept among the cherished memorials of the family of the deceased, or placed beside other remains previously buried in cemeteries or graveyards.

This building, with its appliances, cost about $1,500. A plainer one, equally efficient, could now, at the reduced cost of labor and materials, be built for $1,000. An impression prevails that this crematory was erected for public accommodation, and that the owner of it follows cremation as a business for fees. This is a mistake. It was built for the use of its present proprietor and friends in the vicinity who concur with him in this reform. No fees have been charged, nor ever will be while in his possession.

A not unimportant item in this process is the great diminution in the expense of funerals. The average expenditure for each body buried is $100, the average cost by cremation is $20; the aggregate saving in the United States, from the adoption of this system would annually amount to millions of dollars. The expense of cremation is less than that of an ordinary burial case.

Cremation certainly is not barbarous, for it never entered, nor could it enter, into the heads of barbarous people. It is not burning; there is no pile of wood or other combustibles, no visible flame, no smoke, no sickening odor; it is a process of great scientific skill, the reduction of the body to ashes by the application of intense heat, 1,000° to 2,000° Fahr., by which it is resolved into its chemical elements at once, and without the flame coming into contact with the body.

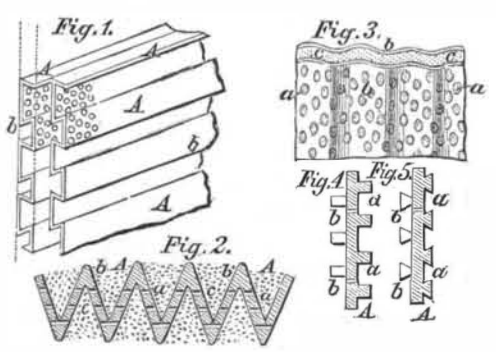
We are all, more or less, carried away by our emotions and sensibilities, especially in the matter of the treatment of the bodies of our dear ones. As rational beings we must not allow our instincts and emotions to run away with our reason, especially in a matter as important as this.

The history of cremation in the United States is very brief, as the progress of such a radical change in long-established customs must, of necessity, be slow. The earliest known instance was of Colonel Henry Laurens, in South Carolina, in 1796. Including that, to the present time not more than eight, or possibly ten, cases have occurred, the last in the current year, and three or four in the crematory at Washington, Pa. Among those who left instructions for the disposal of their remains by cremation was Dr. Charles F. Winslow, of California, a former member of the Society of Arts, whose body was cremated about five years ago, in Salt Lake City, in a temporary furnace erected by his command, by the administrators of his estate. The Washington, Pa., crematory has had nearly one hundred applications, which have been declined, as the trustees do not intend to follow it as a business. They will permit only an occasional cremation there for the purpose of keeping the subject before the public, and of hastening the disappearance of the prejudice which exists against this mode of disposing of the dead. It is believed by them that similar structures will be built at other places, and they will furnish for such laudable purpose any information which their experience enables them to give.

Leaving out of the question, then, all but sanitary reasons, cremation is far preferable to earth burial; and we cannot but think that by degrees this reform will supplant prejudiced superstition, the pomp and profits of undertakers, and give to the living that immunity from many diseases, arising from foul air, impure water, and poisoned earth, which they are entitled to receive from the progress of sanitary science.—*Proc. Soc. Arts, Boston.*

The Sellon Secondary Battery.

Last week we gave an engraving of the form of this battery, now in use with much success at the Electrical Exhibition, Crystal Palace, London. We now subjoin additional illustrations, taken from the English patent of Mr. J. S. Sellon, No. 3,926.



The invention relates to "the use in the construction of secondary batteries of perforated plates or sheets roughened, serrated, or indented, composed of lead, platinum, or carbon, upon, in, or against which plates spongy or finely divided lead, or other salts or compounds of lead, or other suitable substances or compounds are, or may be, held or retained." Fig. 1 represents a perspective view of a perforated battery plate, formed of dovetail section. Fig. 2 shows a section of a perforated plate formed with angular projections or grooves. This plate may be bent into a rectangular or cylindrical form. Fig. 3 shows an irregular section of a compound battery plate formed of two or more plates which may have flat or irregular surfaces. Figs. 4 and 5 illustrate a plate cast with slits and projections, the latter of which are flattened or riveted over during manufacture to cause the retention of the metallic oxide. A A are sheets or plates of lead, platinum, or other material, so formed that a large quantity of spongy or finely divided lead may be retained in or against them in such a manner as to be readily acted upon by the electric current. The plates may be formed of corrugated lead, or of lead cast with holes, *a*, either plain or with flutes, corrugations, indentations, or projections, *b*, in or on which the material, *c*, can be packed. In Fig. 3 the oxides are placed between the sheets, which are riveted or soldered together.

DECISIONS RELATING TO PATENTS.

Supreme Court of the United States.

HEALD *vs.* RICE.—STRAW-BURNING BOILERS.

Decided March 6, 1882.

In error to the Circuit Court of the United States for the District of California.

This was an action at law brought by Rice to recover damages for an alleged infringement of reissue letters patent No. 6,422, granted May 4, 1875, to him for improvements in steam boilers. The original patent was No. 146,614, dated January 20, 1874. The invention, as stated in the complaint, consisted, among other things, of a combination of a straw-feeding attachment with the furnace door of a return flue steam boiler, for the use of straw alone as fuel in generating steam ample for practically operating steam engines. The case was tried by a jury and resulted in a verdict and judgment for the plaintiff, to reverse which this writ of error is prosecuted.

A bill of exceptions sets out the exceptions of the plaintiff in error to the rulings of the court below and all the evidence. The court was asked at the close of the plaintiff's testimony, and again when all the evidence on both sides had been introduced, to instruct the jury to return a verdict for the defendant, the refusal to do which, among other rulings, is assigned for error, and thus the whole case on the merits is brought here for review so far as they rest upon questions of law.

Mr. Justice Matthews delivered the opinion of the court. The findings in substance were:

1. REISSUE—PATENT WITH DRAWING—NEW MATTER.—In cases of reissues of patents, inoperative or invalid by reason of a defective or insufficient specification, or by reason of the patentee claiming as his own invention or discovery more than he had a right to claim as new, it is imperative that the new patent, when issued, shall be for the same invention, and that no new matter shall be introduced into the specification when, as in the present case, there is a drawing, with reference to which the invention is described.

2. SAME—COMPARISON OF PATENTS—QUESTION FOR COURT.—If it appears from the face of the instruments that extrinsic evidence is not needed to explain terms of art or to apply the descriptions to the subject matter, so that the court is able from mere comparison to say what are the inventions described in each, and to affirm from such mere comparison that they are not the same but different, then the question of identity is one of pure construction and not of evidence, and consequently is matter of law for the court without any auxiliary matter of fact to be passed upon by a jury if the action be at law.

3. SAME—STEAM BOILERS—DIFFERENT INVENTIONS.—In the present case it appears from the mere reading of the two specifications that the invention described in the first is for the return flue boiler, while that described in the second, abandoning the claim for the boiler itself, is for a particular mode of using it with straw as a fuel by means of an attachment to the furnace door for that purpose. These two inventions are distinct, and a patent originally used for one cannot lawfully be surrendered as the basis for the reissue for the other.

4. SAME—EXPANSION OF CLAIM.—The rule reiterated that a patent for a machine cannot be reissued for the purpose of claiming the process of operating that machine, because if the claim for the process is anything more than for the use of the particular machine patented, it is for a different invention. (*Campbell vs. James.*)

5. RICE PATENT ANTICIPATED BY MOREY PATENT.—The invention, moreover, is anticipated in Morey's patent, which, in covering the combination of the feeding tube with any kind of thrashing engine or boiler, necessarily includes the combination of the feeding tube with the return flue boiler. This particular application of the feeding tube to the return flue boiler is within the scope and provision of Morey's invention, whether it had been tested by his experience or was anticipated by his foresight or not.

The "Buffalo Gnat" of the Mississippi Valley.

This dreaded pest has appeared this spring in immense numbers in Eastern Arkansas, Western Tennessee, and Western Mississippi, and the great destruction of cattle, horses, and mules caused by it has added to the distress of the inhabitants of those sections of the country caused by the unprecedented floods. The particular species of *Simulium* in question has not been determined. As a cheap way of protecting animals, Professor Riley recommends to wash them once or twice each day, or oftener, if required, with water which has been left standing for several days over coal tar, or in which a small quantity of oil of tar, or oil of turpentine, or any similar material has been stirred.