

**NEW AUTOMATIC CUT-OFF AGRICULTURAL ENGINE.**

The annexed cut represents a new agricultural engine manufactured by Shapley & Wells, of Binghamton, N. Y.

The points claimed are the application of the well known merits of the automatic cut-off to the purposes for which agricultural engines are commonly used, such as thrashing, pressing hay and straw, sawing wood. The valve is a new method of balancing a slide valve, so simple that there is no liability to get out of order in the hands of the most unskilled engineer. Steadiness of motion, showing not over two per cent variation between light and rated power. Impossibility of running away and wrecking the machinery by the breaking of a governor belt, as there is no belt to break, the governing being done entirely in the balance wheel. Economy in fuel and water, using but from one-half to two-thirds of that used by a throttling governor engine.

The frame supporting the engine and boiler is made of wrought channel bar hung on elliptic springs at the rear axle, causing the engine to run smoothly on the road. Wheels are large, making draught light. Pump and beater, and injector, are attached.

The boiler is the Shapley patent, having a conical fire box with horizontal and vertical tubes, removable jacket allowing the engineer to clean tubes while steam is on. It is furnished with suitable plugs at bottom for cleaning water space when necessary.

It is also claimed that the boiler is practically sparkless, from the circuitous route through which they are obliged to pass, nearly all being deposited in the base, the condensation from the heater being all thrown into stack, thereby quenching any stray spark that might exist when dry wood is being used.

**Prevention of Noise.**

To those who carry on any operations requiring much hammering or pounding, a simple means of deadening the noise of their work is a great relief. Several methods have been suggested, but the best are probably these: 1. Rubber cushions under the legs of the work bench. *Chambers' Journal* describes a factory where the hammering of fifty coppersmiths was scarcely audible in the room below, their benches having under each leg a rubber cushion. 2. Kegs of sand or sawdust applied in the same way. A few inches of sand or sawdust is first poured into each keg; on this is laid a board or block upon which the leg rests, and round the leg and block is poured fine dry sand or sawdust. Not only all noise, but all vibration and shock, is prevented; and an ordinary anvil, so mounted, may be used in a dwelling house without annoying the inhabitants. To amateurs, whose workshops are almost always located in dwelling houses, this device affords a cheap and simple relief from a very great annoyance.

**How the Salt Glaze was Discovered.**

In 1680, a very simple accident revealed to the English potters a secret which they ought to have learned long before from the Dutch wares imported into that country. A maid-servant at the farm of Mr. Yates, near Burslem, was preparing in an earthen vessel a salt lye for curing pork. During her temporary absence the liquid boiled over, the sides of the pot became quickly red hot, and when they again grew cold, were found to be covered with an excellent vitreous glaze. The circumstance attracted the attention of Mr. Yates, who related it to a neighboring potter who at once made use of the discovery and imparted it to others. This "salt glaze" soon to a great extent superseded the lead ore glaze hitherto in use, and was employed in the manufacture of "crouch ware," in which all ordinary articles of domestic use produced at Burslem were made.

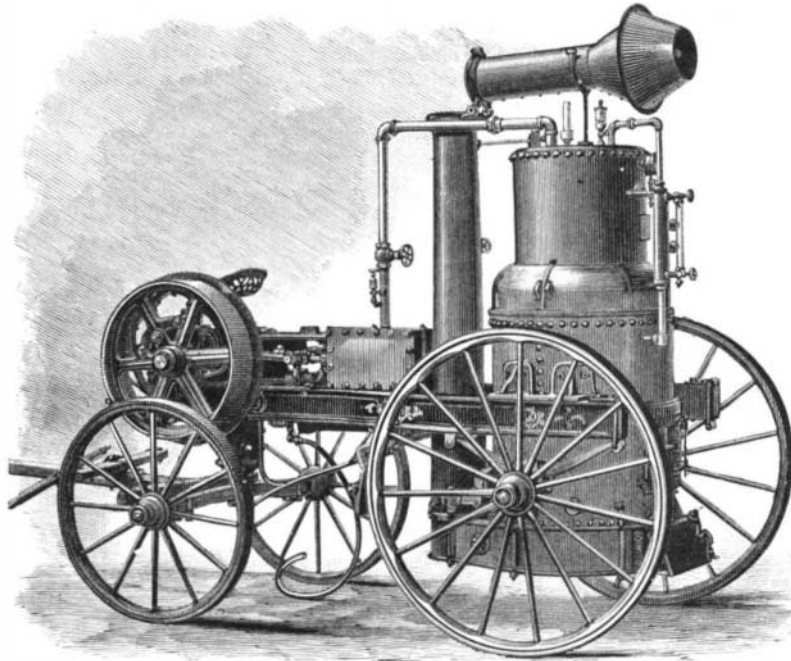
**Photography with Colors.**

A weak print is made from a negative, and after finishing is well washed. This print is then tinted by flat washes of the colors desired, which are diluted with salted albumen instead of water. The print so treated is next floated on a sixty grain bath, dried, and placed under the negative, care being taken to insure its proper registration. The rest of the operations are as usual. Another method consists in painting a weak proof with water color pigments let down with salted albumen. It is then coagulated with alcohol, recoated with salted albumen, floated on silver, printed, and finished as usual as just described.

**ATTITUDES AFTER DEATH.**

BY C. E. BROWN-SEQUARD.\*

Among the phenomena sometimes noticed at the hour of death there is one that offers a peculiar interest, and which, up to recent times, has remained a mystery. This phenomenon appears especially, but not exclusively, after a sudden death due either to wounds received upon the field of battle or elsewhere, or to other causes, but almost always when there has been an intense excitement, and often also when great bodily fatigue has preceded the last moment of life. The principal feature of this curious fact is the persistence



SHAPLEY & WELLS' NEW AUTOMATIC CUT-OFF ENGINE.

after death of the expression of the face or of certain attitudes of the limbs or body, or of both. Such persistence exhibits itself clearly in certain cases; for example, when, despite the sudden cessation of life, a limb that is raised does not drop, or when the body of a man standing, or seated upon horseback, does not fall over.

In order to clearly understand the terms of the problem to be solved in reference to this phenomenon, it is absolutely necessary to know (1) that our attitudes and facial expression depend upon a contraction of our muscles due to an influence of the nervous centers, and (2) that such influence necessarily ceasing at the instant of death, a relaxation must also necessarily occur in all the muscles that were contracted, unless some other agency at once replaces that which has disappeared and causes the same physical state to persist that formerly existed therein.

The question, then, is this: What is the agency that, as soon as the faculty of volition vanishes, takes the place of the latter, or at least produces in the muscles an organic state that prevents all relaxation?

The object of this article is to answer this question, and to

death. One of the most striking examples of the strange fact that I am about to study was observed by Dr. Rossbach, of Wurzburg, upon the battlefield of Beaumont, near Sedan, in 1870. He found the corpse of a soldier half sitting, half reclining, upon the ground, and delicately holding a tin cup between his thumb and forefinger and directing it toward a mouth that was wanting. The poor man had, while in this position, been killed by a cannon ball that took off his head and all of his face except the lower jaw. The body and arms at the instant of death had suddenly taken on a rigidity that caused them to afterward remain in the

position that they were in when the head was removed. Twenty-four hours had elapsed since the battle, when Dr. Rossbach found the body in this state. (See engraving.)

In the first work of any importance in which this subject has been treated of, Dr. Chenu relates that a French military surgeon, Dr. Perrier, was greatly surprised upon going over the battlefield of Alma, the day succeeding the terrible conflict, to see that many corpses of Russian soldiers had attitudes and expressions of countenance like those of living persons. Some of these corpses had the different expressions that characterize anguish, suffering, or despair. Others, on the contrary, had the appearance of greater calmness and resignation.

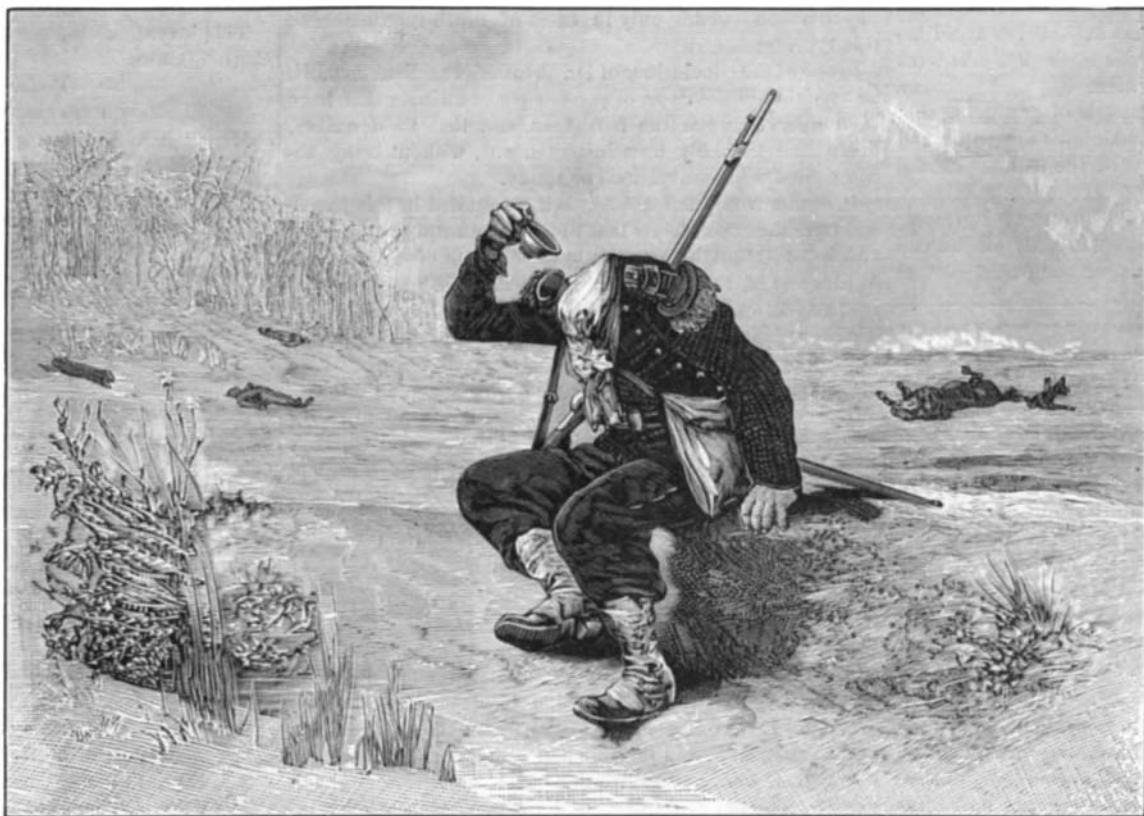
One case, particularly, attracted the doctor's attention, where the body lay stretched out upon the ground, the knees bent, the hands clasped and lifted in the air, and the head thrown back, as if death had come upon the individual while he was reciting a prayer. In addition, many other persons who have visited battlefields immediately after a conflict tell us that they observed numbers of corpses that were still holding their guns or sabers. Some seemed to be biting their cartridges, while others, still upon horseback, continued to preserve the attitude they had at the moment of death. These phenomena have been studied with special attention by Dr. Armand at Magenta, by Baron Larrey at Solferino, and by Dr. Baudin at Inkermann.

I owe to the kindness of Dr. S. Weir Mitchell a knowledge of an excellent memoir by Dr. John Brinton, of Philadelphia, upon the "Rigidity which Accompanies Sudden or Violent Death"—a work in which the question under consideration is studied with the greatest care. Speaking of the field of battle of Antietam, Dr. Brinton says that he counted forty corpses over a space of from 40 to 50 yards square, and he gives us the following picture of what he observed in this place:

"Several of these corpses were lying in extraordinary attitudes, some with their arms lifted and rigid, and others with their legs drawn up toward the trunk, and stiff. With others, in quite large number, the trunk was curved forward and also rigid. In a word, these attitudes were not those of the state of relaxation produced by death, but rather those of an apparently active character, doubtless due to a final muscular act at the very moment of the extinction of life—a spasmodic act that had left the muscles stiff and inflexible. Death, in the majority of these cases, had been caused by wounds made in the breast; and, less frequently, by balls that had traversed the head or abdomen. In the latter cases there had been considerable hemorrhage, as was proved by the pools of blood of dark color near the sides of the bodies. This inspection was made thirty-six hours after death, or still later."

The following three cases related by Dr. Brinton (which were furnished to him by friends) are very remarkable:

A detachment of United States soldiers, foraging around Goldsborough, N. C., came suddenly upon a small band of Southern troopers who had dismounted. These latter immediately jumped into their saddles, and all scampered away except one, after being exposed to one round of fire. The soldier who did not escape was sitting upright, one foot in his stirrup. In his left hand he held the bridle and the horse's mane, while his right hand



ATTITUDE OF A SOLDIER ON THE BATTLE-FIELD TWENTY-FOUR HOURS AFTER DEATH.

show that the cause or agency to be discovered is not the sudden appearance of that state of muscular stiffness known by the name of *rigor mortis* or *cadaveric rigidity*, but that such agency is found in a peculiar action of the nervous centers that man infests itself a little before or at the instant of

grasped the barrel of his rifle, near the muzzle, the stock of the gun resting on the ground. The horseman's head was turned toward his right shoulder, apparently watching the approach of the assailing party. Some of the soldiers of the latter were preparing to fire again, when their officer ordered them to desist, and to go and make the defiant man a prisoner. The latter, upon being ordered to surrender,

\* *La Nature*.

made no answer. When he was approached and examined, it was found that he was dead and rigid in the singular attitude that we have just described. It took considerable of an effort to force his left hand to release the horse's mane and to remove the rifle from his right hand. When the body was laid upon the ground, the limbs preserved the same position and the same inflexibility. This man had been struck by two balls fired from Springfield rifles. One of these had entered to the right of the vertebral column and had made its exit from the body near the region of the heart. It had left its track upon the side of the saddle, and had then dropped to the ground. The other ball had entered through the right temple, and its point of exit could not be found. The horse had remained quiet, as he was fastened by a halter.

The following is another incident: At the battle of Williamsburg, Dr. T. B. Reed examined the body of a United States zouave who had received a ball in the forehead just as he was climbing over a low fence. He, likewise, had preserved the last attitude of his life. One of his legs was half over the fence, while his body still remained behind. One hand, which was partially closed, was raised level with his forehead, with the palm forward as if to preserve himself against some imminent danger.

Dr. Henry Stillé relates that, while seated upon a freight car on the Nashville and Chattanooga Railroad, he saw a brakeman instantly killed by a ball which struck him between the eyes, a mortal wound that was given by a guerilla who lay in ambush in a forest through which the train was passing. The man thus killed was tightening the brake when he received the ball. After his death his body remained fixed, the arms extended and stiff on the handwheel of the brake. The pipe that he was smoking remained fastened between his teeth. The rigidity was so perfect, and his hands were so tightly closed, that it was scarcely possible to free the corpse and make it let go its hold.

A maintenance of the last attitude may occur under circumstances other than a sudden death produced by lesions of the brain, heart, or lungs, although an injury to an organ of great importance to life is the most frequent cause of the phenomena. Dr. Brinton has observed it after wounds made in the abdomen, and Dr. Armand, in a single case, through a wound of the thigh.

Yet this phenomenon does not manifest itself exclusively in cases where death results from wounds. It was observed in a horrible accident that happened at London in 1867, when forty-one persons, skating upon Regent's Park Reservoir, perished through the sudden giving way of the ice. The following extract from the *Times* concerning this event is full of interest:

"The attitude of the majority of the persons who were taken from the water has given rise to numerous discussions in the medical journals. In almost all cases the arms were raised, and sometimes the elbows were pressed against the sides. In other cases the elbows formed a right angle, and projected as in the act of skating. It may be concluded that these unfortunates were resting upon the ice with their arms, not daring to use their hands, and that when, on becoming exhausted, they died, it was not through asphyxia, but rather through the action of cold and fright; and this would explain why they preserved the position in which they were found."

Dr. Taylor had already mentioned the case of an individual who had for a long time held his arms extended to avoid being drowned, and in whom, after death, these limbs were found stiffened out in the same position.

It seems that carbonic acid is capable of producing that special rigidity of the muscles that maintains the trunk and limbs in the attitude that the last act of the will has caused them to assume.

In 1832 Dr. Von Graefe saw, in the grotto of Pyrmont, the corpse of a young man who had voluntarily put an end to his days by exposing himself to the carbonic acid gas that fills this cavern. The body was found half seated upon the ground. One of the hands supported the head, as if the young man had desired to avoid touching the wall, against which the upper part of his body rested. The trunk was bent toward the right. The attitude of the body had the appearance of a person asleep and reposing peacefully.

How shall we explain this curious series of facts? We know that sooner or later there supervenes a stiffness (called *cadaveric* or *post mortem rigidity*) in all the limbs and all other parts of the body where there are muscles. Is not the stiffness that occurs on the battlefield, and sometimes elsewhere, immediately after death, merely a cadaveric rigidity that has come on suddenly? Those who know the law that I have established concerning the rapidity or retardation of cadaveric rigidity after death (see my Croonian Lesson before the Royal Society of London, 1861) will find it evident that in the majority of the cases of preservation of attitude after death that I have just mentioned, the circumstances were very favorable for the prompt appearance of *post mortem* rigidity. Yet, even in the cases placed under the most favorable circumstances, death could not have come on quickly enough to permit of the preservation of an *ante mortem* attitude. This is a sufficient reason to assure us that the fact that we have to explain is not due to the sudden intervention of cadaveric rigidity. But how, then, shall we explain this fact?

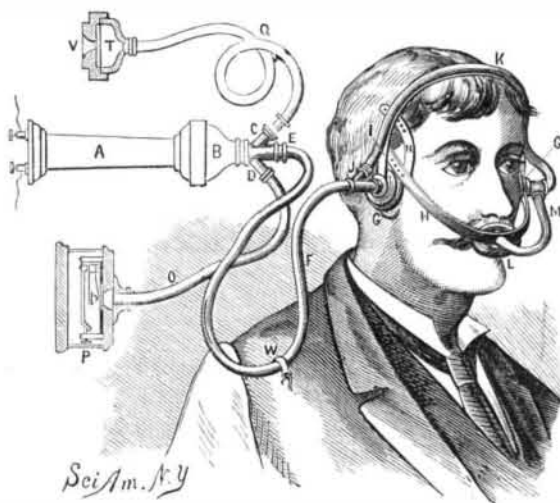
Some experiments that I cannot here give the details of have shown me that it is a fixed contraction—a tonic, persistent, muscular action which then occurs, similar to that which it replaces, and which existed during life. At the

very moment that death comes on, this fixed or tonic contraction occurs. It is an act of life, but the last one. I have sometimes seen this contraction exhibit itself and then disappear, and it was not till later that the true cadaveric rigidity supervened.

Death, in man as in animals, takes place in two ways that differ radically from each other. On the one hand, it may supervene suddenly, either through the influence of excitement or that of a wound or blow, or, again, through the following causes: The impression produced by submersion in cold water, or in almost icy water, and the impression produced sometimes, in persons who are eminently nervous, by the least lesion affecting certain parts of the body. In this kind of death there may not be even the least vital manifestation after the last sigh, except a feeble action of the heart that soon disappears. All the cerebral faculties give way suddenly—consciousness, intelligence, the will, the perceptive faculties, sensorial and sensitive impressions, and respiratory motions all disappear at once. There is no *agony*, and none of that struggle that usually precedes death. The body suddenly loses its temperature, and cadaveric rigidity comes late, and lasts considerably.

In the other kind of death, which is the one that we usually observe, there is, on the contrary, a genuine struggle in the still living organism, especially when life is ending through the effect of certain wounds or of a great hemorrhage, or as a consequence of a complete and sudden deprivation of respiration. The heart in such a case beats violently, the efforts made to breathe are extremely energetic, consciousness and the cerebral faculties may keep up for a short space of time, and after this, great agitation or general convulsions occur. The temperature of the body rises, and this increase may still continue for some little time after the last effort made to breathe. Cadaveric rigidity appears early, but never immediately.

My experiments and the details of the cases that I have related show that the persistence of the last attitude does not occur in all cases of death belonging to the first of the two



WARTH'S TELEPHONE SUPPORT.

types just described; but facts indicate that this singular phenomenon occurs only in cases of death that belong to this type.

In one of the conclusions of Dr. Brinton's excellent memoir he says that in the cases of persistence of attitude that have been observed upon the battlefield, and that he describes, death had probably been instantaneous, without being accompanied with convulsions or agony.

It results from the facts that I have studied in this paper, and from the experiments that I have done nothing more than allude to: (1) that the preservation after death of the attitudes of life, and of the facial expression, does not depend upon the sudden appearance of what is called cadaveric or *post mortem* rigidity, but upon the production of a vital act of rigidity or tonic contraction, like the fixed spasm that we often see in hysterical or paralytic persons; and (2) that a number of causes of death, acting without the ordinary agony, may produce that strange phenomenon which is characterized by a persistence after death of the attitude and facial expression that existed at the moment of the last sigh.

#### A Strong Money Box.

Mr. William H. Vanderbilt's treasure vault, in which it is said he recently stowed away some \$100,000,000 in securities, is one of the most redoubtable works of defense on the American continent, though you may not be entirely certain of that by surveying his mansion from the outside. Its foundations were blasted out of the rock; the front wall is 5 ft. in thickness, and the side and rear walls 8 ft., the materials used being pressed brick with brown stone trimmings. The beams, girders, and main pillars are iron, incased in fire proof material. The doors, window frames, and minor partitions are iron, marble, and glass. No wood is to be found in the structure. The great vault is 36x42 ft., of wrought iron, steel, and Franklinite iron, is imposing in strength and proportions, and is situated on the ground floor. Its four outer doors weigh 8,200 pounds each, and have every effective and known improvement in defensive devices. A massive wall of masonry surrounds the iron work. The vault, which is burglar, fire, and water proof, constitutes a distinct building in itself.

#### Anti-Induction Wires.

Mr. F. N. Gisborne, superintendent of the government telegraph service of Canada, has introduced his new system to obviate the evil effects of electrical induction in underground and aerial conductors.

Experiments have been made with a section of cable about three thousand feet in length, constructed under his direction, and laid underground between two of the departmental buildings in Ottawa. The cable contains twenty indifferently insulated conductors or wires, which are divided into pairs, two conductors being twisted together in each case. Each pair constitutes a metallic circuit, one conductor being used as a "return," instead of the earth plates usually employed. The peculiarity of the invention consists in the twisting of these metallic circuit conductors, as both wires are thus made to occupy an equidistant relationship with respect to any other conductor or pair of conductors in their vicinity. By this device a current introduced into a circuit is conducted down one wire, and up the other; and, the position of both wires being the same with respect to neighboring circuits, the inductive effect of the current passing down one wire is neutralized by the inductive effect of the same current passing up the return wire.

The twisting of the wires of the metallic circuits lessens the effect of induction of the current upon itself. When the wires of a metallic circuit are laid parallel throughout, the current induced from one wire into the other is in the same direction as the current itself passing in that wire; the effect of the current is therefore prolonged, and retardation experienced in a marked degree; whereas, when the wires are twisted closely (say, two turns to the inch), the wires occupy throughout their length a position approaching right-angles with respect to each other; and the induced currents are thereby materially lessened, and retardation rendered less appreciable.

#### TELEPHONE SUPPORT.

The receiving telephone, A, is of the ordinary construction, and is supported in a fixed position; it is provided with a mouthpiece extension, B, having three branch tubes, D C E, for receiving flexible tubes. A curved spring, I, of nearly semicircular form, is jointed to a similar spring, H, and these two springs are kept in a fixed position in relation to each other by the brace, N, which is made adjustable in order to adapt the apparatus to the heads of different users. Attached to the ends of the spring, I, are earpieces, G, provided with tubes, F, having branches, J. The tube, F, communicates with the central tube of the extension, B, on the receiving telephone, and the tube, K, communicates with the other earpiece, and a branch, M, communicates with the mouthpiece, L, secured to the center of the spring, H. By this means the earpieces and the mouthpiece are held in position for use. The branch, D, is connected with the transmitter, P; the branch, C, is connected with the earpiece, T, to enable a second person to listen.

Sounds produced by the receiver diaphragm are communicated to the ears through the tubes, F K, and the earpieces; and speech uttered in the mouthpiece affects not only the transmitter through the tubes, M K, F, and O, but also the receiver, which thus acts as a transmitter also and augments the volume of sound transmitted. To prevent the accidental jerking of the apparatus from the head, the tube, F, is attached to the clothing by a clasp pin.

This invention has been patented by Mr. N. G. Warth, of Canton, Ohio.

#### New Process for Preserving Meat.

Mr. Richard Jones, who has for many years devoted his attention to the preservation of meat, has now adopted a new process. The principle consists in the injection of a fluid preparation of boracic acid into the blood of the animal immediately after it has been stunned, and before its heart has ceased to beat; the whole operation, including the removal of the blood and chemical fluid from the body of the animal, only taking a few minutes. The quantity of boracic acid used is very small, and that little is almost immediately drawn out again with the blood. The preservation of the flesh is said to be thoroughly effected; the quantity of the chemical left in the flesh must therefore be very small, and can scarcely be injurious to the human system; for, as Professor Barff has proved by experiment, living animals, either of the human or other species, do not seem to be injured in any way by the consumption of it. A demonstration of the effects of the process was given in April at the Adelphi Hotel, London, when the joints cut from a sheep that had been hanging for more than seven weeks at the house of the Society of Arts were cooked in various ways, and those present agreed that the meat was equal to ordinary butcher's meat.

#### The Louisville Exposition of 1884.

The exhibition of last year at Louisville, Ky., was a brilliant success. The attendance was large, and there was a good representation from all parts of the country. The managers state that of 600 car loads of machinery sent there from the Eastern States, less than 100 car loads were returned, so large a proportion of the articles having been sold during the exhibition. The exhibition this year will open August 16, and close October 25. Louisville is now very near the center of population of the United States, and there is no better section of the country for the enterprising manufacturer seeking a market than is to be found within a radius of two or three hundred miles of that city.