LIGHT IN DARK PLACES.

LIGHT IN DARK PLACES,

BY

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GRATIS.

LIGHT IN DARK PLACES.

THE following pages are intended to convey, in the briefest and simplest form, ocular illustration of the meaning of the much disputed word *Vivisection*. Some of the apparatus and of the furniture of the physiological laboratory, various modes of fastening the victims, and a selection of instances of divers experiments, have been arranged with the view of affording the reader by a few moments' inspection a truer idea of the work of the "torture-chambers of science" than can be obtained by the perusal of a vast quantity of letter-press description.

Every one of the illustrations is a reproduction, in most cases of reduced size, by photo-zincography, of the engravings and wood-cuts in the standard works of the most eminent physiologists. In every case the reference to the original work is given, and the perfect accuracy of the reproduction guaranteed. Nothing has been added and nothing has been taken away, except somewhat of the strength and vividness of the larger originals, which have been lost in the reproduction. Thus every illustration in this pamphlet may be taken with certainty to be a *Vivisector's own picture of his own work*, such as he himself has chosen to publish it.

Further, it must be borne in mind that the experiments here exhibited, with the exception of two or three peculiar ones at the end, are not, as might be supposed, single instances of severe operations performed once or twice in a way by one particular physiologist. The greater number are, so to speak, *stock* experiments. They are gone over by each new recruit in the army of

science who takes up the study of the organs concerned, and may be likened more properly to the scales and exercises of the musical practitioner, than to the purposeful operations of the surgeon. In the editor's (Dr. Burdon-Sanderson's) Preface to the English *Handbook of the Physiological Laboratory*, he says: "This book is intended for beginners in physiological work. It is a book of methods . . designed for workers . ." The whole large volume is in the form of a receipt-book for cookery. "Proceed as above" . . "Divide the lingual nerve" . . . "A cannula having been placed in the carotid, a second manometer is placed," &c. "For this purpose, (asphyxia) a cannula must be fixed air-tight in the trachea," &c. "In these spasms, which accompany the final gasps of an asphyxiated animal, the head is thrown back, and they must be carefully distinguished by the student from the expiratory convulsions previously described—and so on through 558 pages. The great foreign treatises of Cyon, Claude Bernard, Paul Bert, and Livon, are to the same purpose.

Finally, as regards anæsthetics, it is needful that the reader should dispel from his mind all illusion on the subject. No defence of Vivisection is so frequently offered and so generally accepted as the assertion that, in the vast majority of experiments, the animals are rendered wholly insensible to pain by means of anæsthetics. Persons who shrink from the miserable subject naturally seize on this assurance with relief, and thenceforth turn a deaf ear to the advocates of the suppression of the practice. What is the truth of the case?

There are to be considered: 1st. Real anæsthetics (chloroform, ether, nitrous oxide, &c.); 2nd, narcotics (opium, chloral, &c.); 3rd, doubtful anæsthetics (Curare).

1. Real Anæsthetics.—Chloroform and ether are most generally used for serious operations on human subjects, as nitrous oxide is only adapted for operations of very short duration. The action of chloroform and ether, however, is not identical on man and on the lower animals. Chloroform is a specially dangerous drug to dogs and rabbits. Professor Pritchard, M.R.C.V.S., giving his evidence before the Royal Commission,

said: "With regard to dogs, I should never think of applying chloroform at all; I should think it very unsafe to do so. The dog has an intermittent pulsation; the heart's action is intermittent." (Q. 796-803.) Mr. T. R. Lewis, M.B., F.R.S., Assistant Professor of Pathology in the Army Medical School, lamented that chloroform is so very fatal to rats and rabbits, as also to puppies and young dogs. He said: "Even in large healthy dogs, we calculate on losing one in five through this cause alone." Dr. Geo. M. Sternberg, in his *Manual of Bacteriology*, 1892, p. 97, says: "Rabbits, especially, are very apt to die from chloroform, no matter how carefully it may be administered." Dr. George Rolleston said before the Royal Commission: "It is not so easy a thing to know when you have an animal thoroughly anæsthetised; and what is more, some animals recover with much greater rapidity than others of the same species from the same doses of anæsthetics." . . . . "The whole question of anæsthetising animals has an element of uncertainty about it." (Q. 1,349-50.)

2. As regards NARCOTICS; here is what Claude Bernard says of the most important of them in his *Physiologie Opératoire*, p. 155 (Paris, 1879). After a large dose of morphia, he says the dog "still feels pain though he has, so to speak, lost the idea of defending himself."

"Placé dans la gouttière à vivisection il y demeure immobile et stupefié: jamais il ne cherche à mordre, quelque opération qu'on lui fasse subir. Il sent la douleur mais il a, pour ainsi dire, perdu l'idée de la défense."

3. OF CURARE, which the present day vivisector is very anxious to pass off as an anæsthetic, Claude Bernard, the greatest authority on the subject, as he is the greatest discoverer of the effects of Curare, says in *Revue Scientifique*, 1871-2, p. 892:—

"Curare acting on the nervous system only suppresses the action of the motor nerves, leaving sensation intact—Curare is not an anæsthetic agent." Sixième Année, p. 591: "Curare renders all movement impossible, but it does not hinder the animal from suffering and from being conscious of pain."

These opinions of his are to be found repeated several times in the same work. Even in his latest remarks on the same subject (vol. 1874-75, p. 1117) he refers to experiments where the patients on their recovery had been able to relate "that during paralysis they had been fully aware of their existence, and of all that happened around them." Vulpian, also, the next best authority, says in the latest work, "*Leçons sur l'appareil vaso-moteur*," Paris, 1875, Tom. 2, p. 660: "Curare does not act on the sensory nerves, or, at least, does not abolish their functions." Kœlliker also demonstrates the fact that under the toxic influence of Curare sensibility remains absolutely intact. See *Dictionnaire Encyclopédique des Sciences Médicales*, Ser. 1, Tom. 24, 1880, Art. *Curare*.

Again, Claude Bernard, in his classic paper "On Curare," in the *Revue de Deux Mondes* for Sept., 1864, after quoting the opinion of travellers, and more especially of Waterton, says (p. 173) :—

Thus all their descriptions offer us a pleasant and tranquil picture of death by Curare. A gentle sleep seems to occupy the transition from life to death. But it is nothing of the sort; the external appearances are deceitful. In this paper it will be our duty to point out how much we may be in error relative to the interpretation of natural phenomena where science has not taught us the cause and unveiled the mechanism. If, in fact, we pursue the essential part of our subject by means of experiments into the organic analysis of vital extinction, we discover that this death, which appears to steal on in so gentle a manner and so exempt from pain, is, on the contrary, accompanied by the most atrocious sufferings that the imagination of man can conceive (and p. 182). In this motionless body, behind that glazing eye, and with all the appearance of death, sensitiveness and intelligence persist in their entirety. The corpse before us hears and distinguishes all that is done around it. It suffers when pinched or irritated; in a word, it has still consciousness and volition, but it has lost the instruments which serve to manifest them.

Can we require any more decisive evidence of the entire indifference of physiologists to the agonies they cause, than to read in a subsequent volume *by the same writer*, the complacent statements, made without a syllable of reproval or regret, to his fellow labourers in the torture-field :—

Curare is now employed in a vast number of experiments as a means of restraining the animals. There are but few observations of which the narrative does not commence by notifying that they were made on a curarised dog.—*Leçons de Physiologie Opératoire*, Paris, 1879, p. 168.

He believes that it creates "the most atrocious sufferings which the imagination of man can conceive" ("des souffrances

les plus atroces que l'imagination de l'homme puisse concevoir"), and yet he is perfectly satisfied that it should be "employed in a vast number of experiments as a means of restraining the animals!"

Claude Bernard is now declared to have been wrong in his conclusions made after his careful experiments, that Curare paralysed the nerves of motion, while it left the nerves of sensation more alive to suffering than before, but is extremely valuable to the experimenter as a means of keeping the animal motionless as a corpse while he performs his work. We are told now, that Curare is an anæsthetic itself. We are also told that the whole enquiry must start afresh from experiments on Amœbæ and the lowest forms of life. Be it so, we are not "researchers," and claim no authority to decide such a point; but we may repeat the remark of a late physiologist, that if physiological research were good for anything and could determine any point whatever, it had effectually decided that *Curare* was not an anæsthetic and did not abolish pain.

Professor Gamgee, before the Royal Commission, said that he had performed some experiments with Curare, on children, and that in consequence he "was able to determine, very decidedly, that sensibility was not at all impaired; although there was a certain amount of paralysis of motion produced by the Curare, there was no affection of the sensory nerves."—*Report*, Q. 5,407.

We shall require something more than the *ipse dixit* of the new school of physiologists before we accept the convenient explanation of interested vivisectors in opposition to the positive experiments of such physiologists as Claude Bernard and Professor Gamgee as to the non-anæsthetic influence of Curare. When a committee of experimental physiologists has deputed one or two of its members to submit to a painful experiment performed under Curare alone we shall listen more respectfully to its decision.

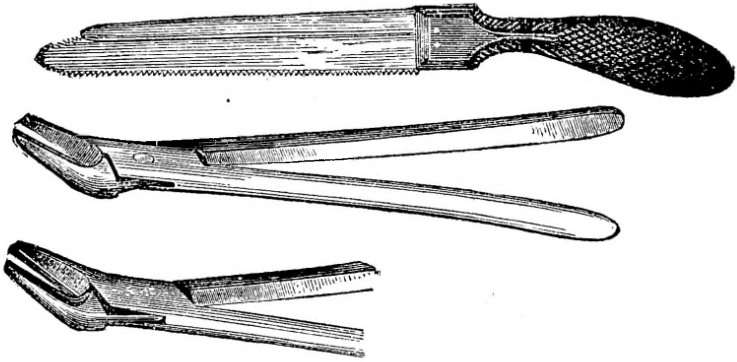
I now proceed to show what are the simplest tools of vivisectors.

The illustration below is taken from Livon's *Manuel de Vivisection* (Bailliere, Paris), p. 8, a book issued in 1882 from the new school of Vivisection in Marseilles. The three instruments are described respectively as—

"A little saw for sawing the vertebræ."

"Bone forceps to open the vertebral canal."

"Forceps of which the teeth cross like scissors intended to cut the bones of old animals."

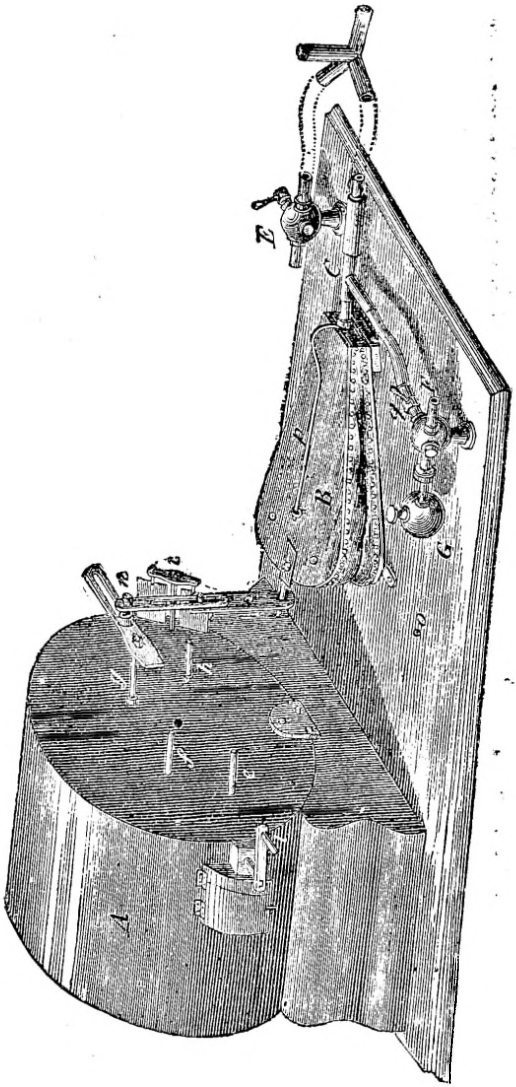


Livon's *Manuel de Vivisection*, p. 8.

We next reach (page 11) one of the many instruments in use (this is Schwann's) for sustaining Artificial Respiration. It is to be understood that when an animal is curarized the muscles are so completely paralyzed that it ceases to breathe, and would immediately die were not artificial breathing kept up by pumping air into the lungs. This is sometimes done by hand, but in large laboratories it is customary to keep a water-engine or steam-engine at work for the purpose. In Ludwig's laboratory it has been stated that the engine in question never ceases playing day or night, sustaining life in the dogs and other animals extended on the vivisecting tables around.

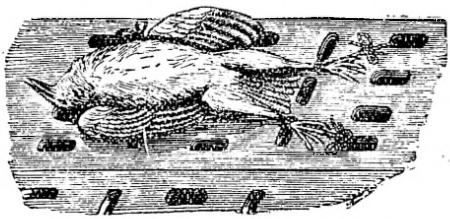
There are an immense number of other instruments, some infinitely more elaborate and costly than this, in use in laboratories, and figured in the various treatises; and their various makers in London (Messrs. Hawksley, Messrs. Cettie and Co., Messrs. Elliot and Co.), and in Paris, Heidelberg, Berlin, Wurzburg, &c., are variously specified and recommended (vide in particular the list of

such instruments, and where they can best be procured, in Dr. Burdon-Sanderson's *Handbook*, p. 573). Plates exhibiting these costly instruments fill 43 large pages of Cyon's *Atlas*, and 21 of the English *Handbook*, and afford convincing proof of the enormous extent of a practice which can require and defray the expense of manufacturing such tools.

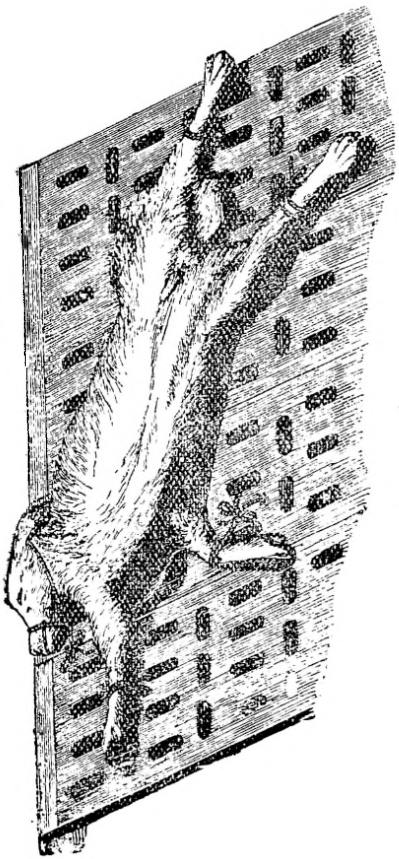


Instrument for producing Artificial Respiration.
From Bernard's *Physiologie Opératoire*, p. 227.

I next pass to the various forms of the Vivisecting Tables—or Torture-troughs as they have been called—in use in every laboratory. From the simple table with holes, through which cords are conveniently passed to bind the limbs of the animal, (page 12) to the more elaborate trough and double trough, (pages 12 and 13) the illustrations explain themselves.



From Bernard's *Physiologie Opératoire*, p. 126.

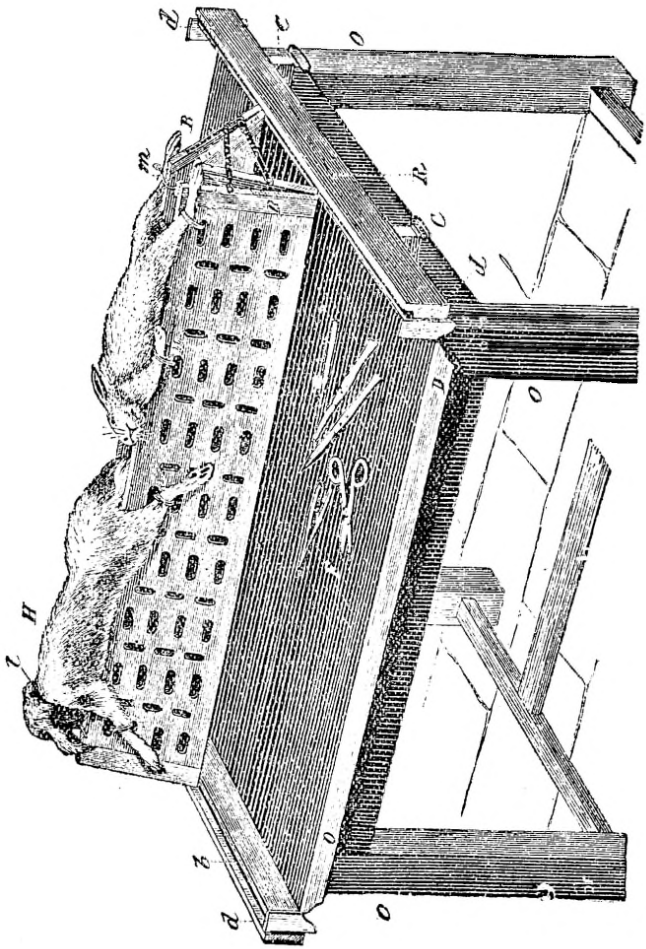


From Bernard's *Physiologie Opératoire*, p. 125.

From Bernard's *Physiologie Opératoire*, p. 135.

With respect to the last illustration, of the rabbit and dog on the trough with an elevated ridge, it will be seen how well the instrument would serve for the experiment lately shown to students in Florence, described in the *Zoophilist* for May 1st, as follows:—

The following story has been sent us on the best authority from Florence:—

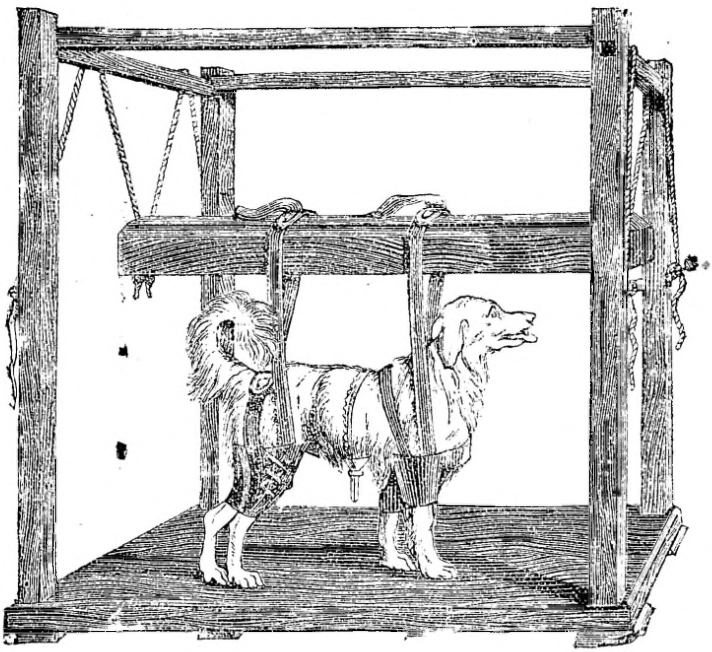


A Dog and Rabbit on a Torture Trough.
From Bernard's *Physiologie Opératoire*, p. 131.

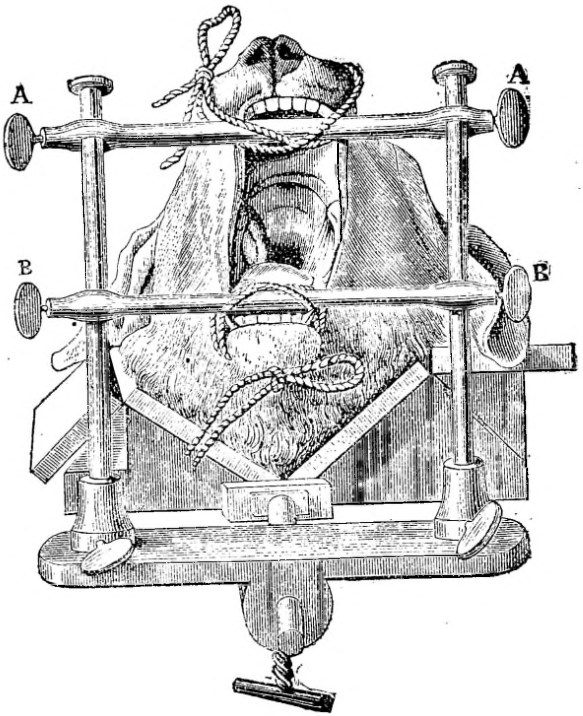
A young man, son of a well-known and respected veterinary surgeon, gives this account of the spectacle he witnessed at a lecture:—

"A dog, with its four feet fastened to a table, and supported by a sort of *chevalet*" (no doubt the usual vivisecting trough reversed), "had its skin cut and turned back all along the back from the neck to the tail. This was done in such a way that the spinal canal was laid bare, and the nerve roots exposed so that they could be touched like the strings of an instrument with a pair of forceps. To each touch responded a cry of agony like the notes of a violin. The scene was so revolting that after a time the young man left the place."

Again, we have illustrations of elaborate methods of suspending a dog's body in an upright position, to be maintained for several days as in the treating of gastric or hepatic fistulas, and of a dog's head (page 15) when the jaw is to be kept open.



Cyon, Plate xxvi., Fig. 7



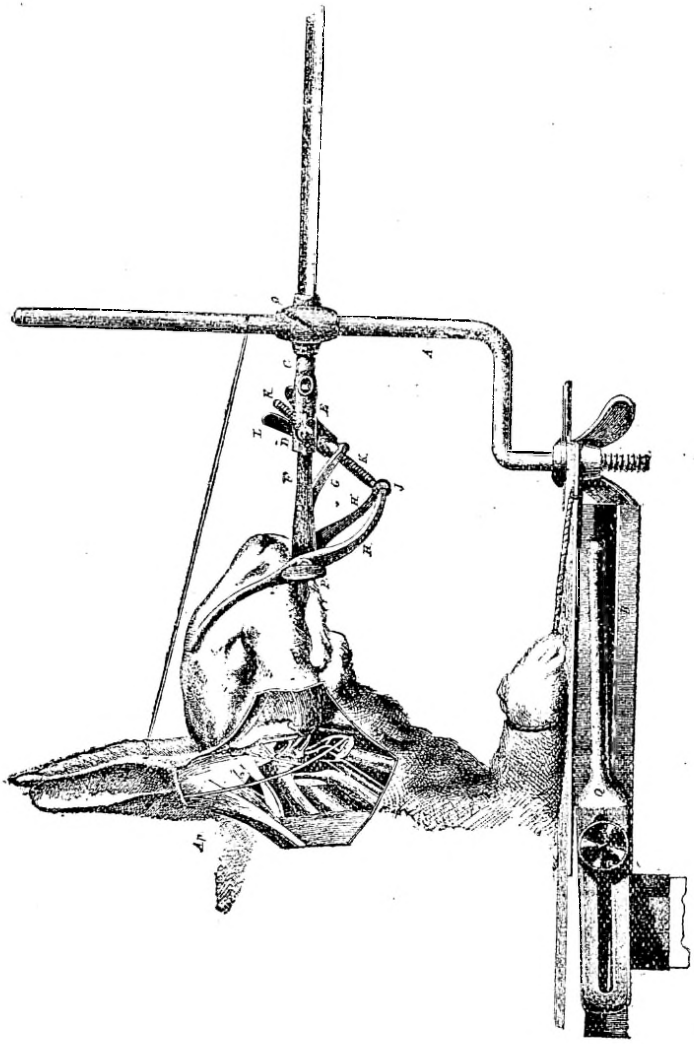
From Bernard's *Physiologie Opératoire*, p. 137.

The next illustration (page 16) represents an instrument very frequently mentioned in these works :—Czermak's Rabbit-holder, with the rabbit's head fixed in it, and the nerves of the neck dissected out. This illustration (including some anatomy of the parts as well as the actual vivisection) is from M. de Cyon's *Methodik der physiologischen Experimente und Vivisectionen* (Giessen, St. Petersburg, 1876).

It is in the preface to these volumes that M. de Cyon gives his well-known description of a true vivisector :—

"The true vivisector must approach a difficult vivisection with the same joyful excitement, and the same delight, wherewith a surgeon undertakes a difficult operation, from which he expects extraordinary consequences. He who shrinks from cutting into a living animal, he who approaches a vivisection as a disagreeable necessity, may very likely be able to repeat one or two vivisections, but will never become an artist in vivisection. He who cannot

follow some fine nerve-thread, scarcely visible to the naked eye, into the depths, if possible sometimes tracing it to a new branching—with joyful alertness for hours at a time; he who feels no enjoyment when at last, parted from its surroundings and isolated, he can subject that nerve to electrical

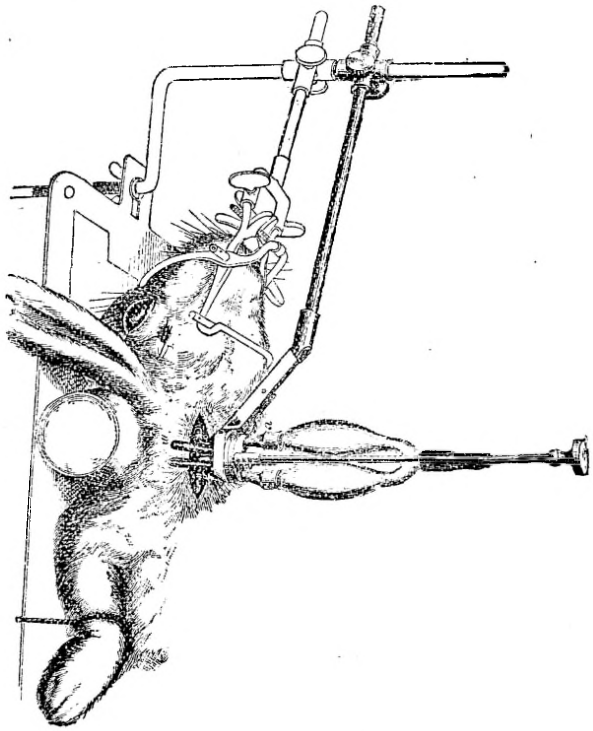


Cyon, Plate vii.

Czermak's Rabbit-holder, with nerves of Rabbit dissected out, and anatomy of the parts.

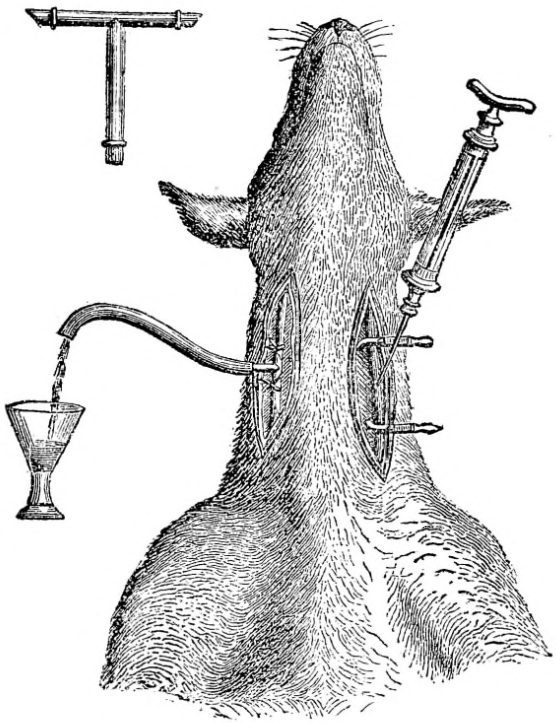
stimulation; or when, in some deep cavity, guided only by the sense of touch of his finger-ends, he ligatures and divides an invisible vessel; to such a one there is wanting that which is most necessary for a successful vivisector. The pleasure of triumphing over difficulties held hitherto insuperable is always one of the highest delights of the vivisector. And the sensation of the physiologist, when from a gruesome wound, full of blood and mangled tissue, he draws forth some delicate nerve-branch, and calls back to life a function which was already extinguished—this sensation has much in common with that which inspires a sculptor, when he shapes forth fair living forms from a shapeless mass of marble.—*Methodik*, p. 15.

Here is another machine, invented by Ludwig, one of the leading members of the Leipzig Society for Protection of Animals, and, at the same time, the head of the largest physiological laboratory in the world.



Cyon, Plate xxii.
Ludwig's Machine for measuring the rate of the blood-current in arteries of rabbits.

The next illustration (page 18) exhibits one of the minor processes of vivisection, an experiment intended to test the time required for poisons to circulate through the system.

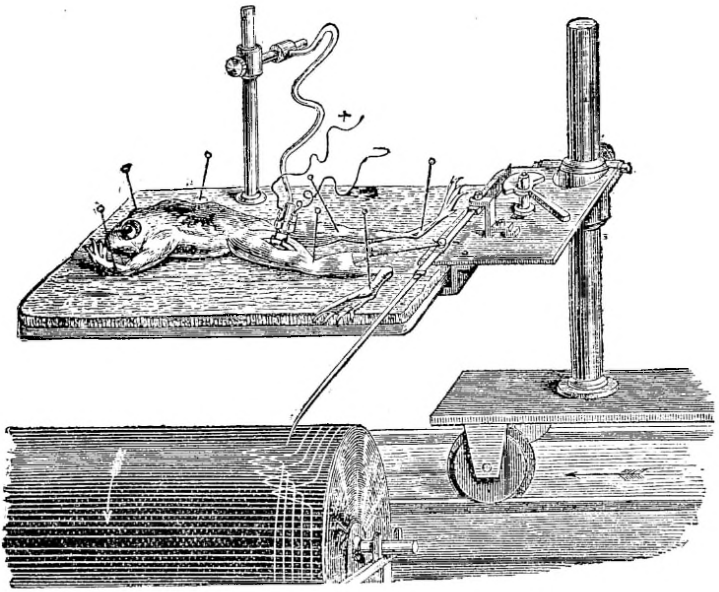


Experiment for testing the time required for injected poisons to traverse the circulation.

From Bernard's *Physiologie Opératoire*, p. 372.

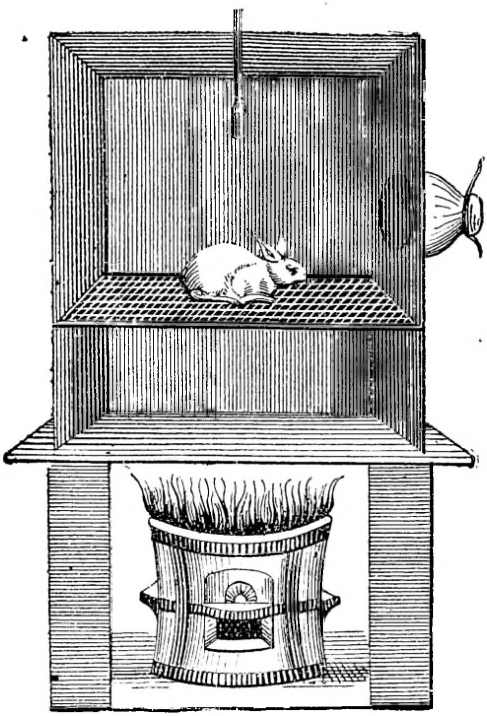
Here (page 19) is an experiment (not a painful one, for the frog is already pithed and practically dead), exhibiting the manner in which frogs,—the poor creatures which Marshall Hall blasphemously called "God's Gift to the Physiologist,"—are pinioned on a piece of cork for experiments with what is termed a mycograph.

The illustration is taken from the second volume of the *Handbook of the Physiological Laboratory*, Plate ciii.



Handbook of the Physiological Laboratory, Plate ciii.

We now come (page 20) to an illustration which will be recognised by many readers—the first of the two Stoves invented and used by Claude Bernard. It is taken from his *Leçons sur la Chaleur Animale*, Paris, 1876, p. 347, and represents, as M. Bernard states, his "first apparatus for the study of the Mechanism of Death by Heat." Of the results of experiments made with it he prints several tables. These tables show how dogs, pigeons, and rabbits baked in the stove, expired at the temperatures of 90° or 100° Cent. in 6 minutes, 10 minutes, 24 minutes, &c., and at higher temperatures at different intervals; and again how, when, the apparatus formed a hot bath (*i.e.*, the animal was boiled instead of baked alive), a different scale of heat and subsequent death was observed. A small dog placed in a temperature of 55° expired after 8 minutes, and so on. Again, another series of results were obtained when the head of the victim was kept outside the stove, while its

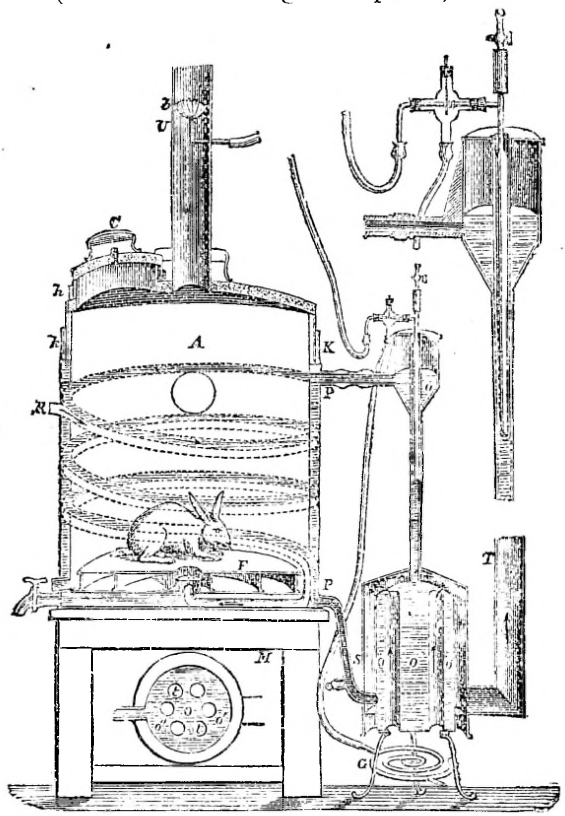


Bernard's *Leçons sur la Chaleur Animale*, p. 347.

body was baked or boiled. "The animals" (M. Bernard notes, page 356) "exhibit a series of symptoms always the same and characteristic. At first the creature is a little agitated. Soon the respiration and circulation are quickened. The animal opens its mouth and breathes hard. Soon it becomes impossible to count its pantings; at last it falls into convulsions, and dies generally in uttering a cry."

In a subsequent table M. Bernard gives the particulars of the deaths in this apparatus of seventeen dogs and of numerous rabbits and pigeons; and then proceeds in the next lecture to show his audience the diagram of another and more elaborate stove, in which many other series of animals were sacrificed.

Here (page 21) is the second and more elaborate stove invented and used by M. Bernard, of which the aspect is less familiar. He says of it, p. 361 :—"The machine which served our first experiments presented an imperfection which rather complicated the phenomena, and might in a certain degree vitiate the appreciation of the action of temperatures on living beings. . . . The machine of which we have recently availed ourselves has not this inconvenience—" (Then follows a long description.)

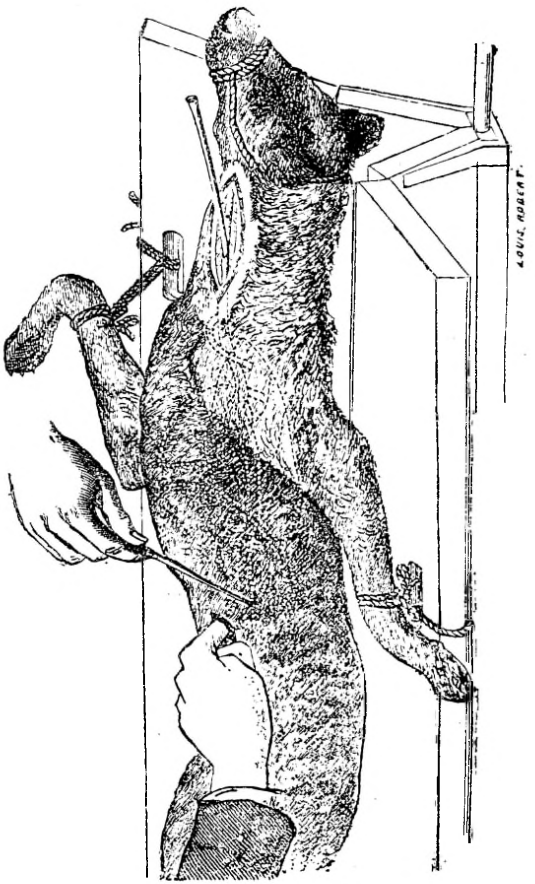


Bernard's *Leçons sur la Chaleur Animale*, p. 363.

"In the stove we place a sparrow. The temperature is about 65 (Centigrade). At the end of a minute we see the animal open its beak, manifest an anxiety which becomes more and more lively, breathe tumultuously, then fall and die. . . .

We try the same experiment on a rabbit. The same series of phenomena are exhibited, but more slowly, for it only dies at the end of twenty minutes. . . . ."

I now come to experiments in what is called Catheterism. They are described at great length in Claude Bernard's *Physiologie Opératoire.* The illustration (page 22) represents catheterism of the blood-vessels, showing how long flexible tubes are inserted at some convenient part of a blood-vessel, and then pushed along into the different parts of the heart and blood-vessels. Blood may



From Bernard's *Physiologie Opératoire,* p. 282.

thus be obtained from a given part for analysis; or the temperature may be ascertained by pushing thermometers into such otherwise inaccessible regions. In these experiments there is no pretence of giving anæsthetics; and as a matter of fact as well as logic none are given, for they would greatly interfere with the results when a careful analysis is to be made of the blood so obtained from special regions, or when it is a question of the temperature which normally exists there.

To the above description we may add that the jugular vein in the neck of the bound-down and muzzled animal has first been carefully dissected out and opened into, and, through the opening thus made, the bent tube or catheter has been inserted and pushed down through the heart into the great vein which brings the blood from the liver and hinder part of the body.

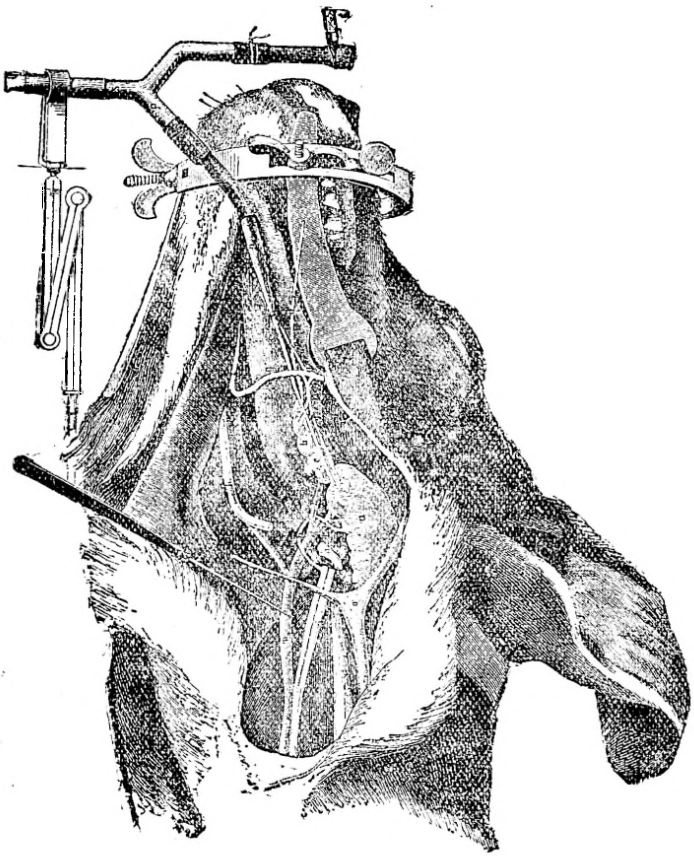
The next figure (page 24) represents a dog with the salivary glands, and the nerves supplying those glands, exposed. A cannula (small pipe) is fixed into the duct of the gland. A muzzle of an elaborate kind is placed upon the jaws.

M. de Cyon in his article in the *Contemporary Review*, April, 1883, mentions this drawing (which was one of those exhibited life-size on the hoardings of London in 1877), and asserts that it was drawn from the dead body of the animal. It may be possible that the actual dog from which M. de Cyon made his sketch was at that moment no longer living, but that the hideous mutilations exhibited in the drawing had been inflicted while he was still living is proved by two circumstances,—one by the presence of the elaborate muzzle, which assuredly no one would have placed on the corpse of a dog,—and secondly, by the presence of the cannula fixed into the duct of the salivary gland; a gland which of course, like any other, ceases to secrete at death, and into which therefore it is absurd to suppose a cannula would have been inserted after death. M. de Cyon's assertion that the dog represented is a dead one is also thoroughly disposed of by an extract from his own book quoted in an excellent letter by Mr. Ernest Bell published in the *Spectator*, April 7th, 1883. Speaking of the plates in M. Cyon's work—

"When he tells us that these plates are, 'of course, drawn from the dead

body of the animals,' he probably is speaking the literal truth as regards the plates, but in as far as he wishes us to infer that the operations they represent were done on the dead body, he is saying what his books show to be untrue. For, concerning one of the plates (No. xv.), I find on p. 264 of the work the following paragraph :—

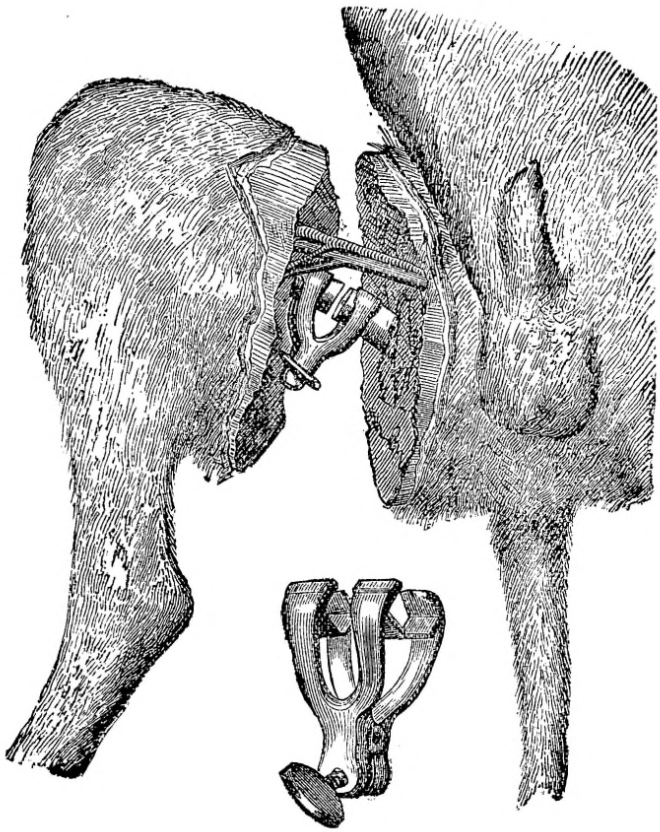
"If the experiment is made only for demonstration, one can drug the animal beforehand with chloral, chloroform, or curari, and if the last-named poison is applied, artificial respiration must be used. If, on the other hand, one wishes to use the experiment for purposes of observation, particularly if the investigation concerns the influence of the circulation on the



From Cyon's *Atlas*, Plate xv. (See preceding page.)

activity of the glands, it is better to avoid these drugs, on account of their influence on the circulation. One should choose for the experiment strong, lively animals, which have been well fed for a few days previously."

The next figure shows the limb of a dog entirely severed, including the bone, with the exception of the main artery and the vein through which strychnine when injected passes into the trunk. This experiment is now done under anæsthetics, but Majendie devised and continually repeated it many years before chloroform was discovered.



From Bernard's *Physiologie Opératoire*, p. 337.

The following illustration (page 26) is the triumph of M. Paul Bert's genius, and certainly exhibits in a remarkable degree the fitness of that gentleman to exercise (as he did two years ago) the function under M. Gambetta's Government, of Minister of Worship and Public Instruction. So proud is M. Bert of this achievement in thus transforming a living dog into the resemblance of a piece of wood (*un morceau de bois*) that his portrait has been exhibited in Paris holding up the tortured animal in the attitude depicted.

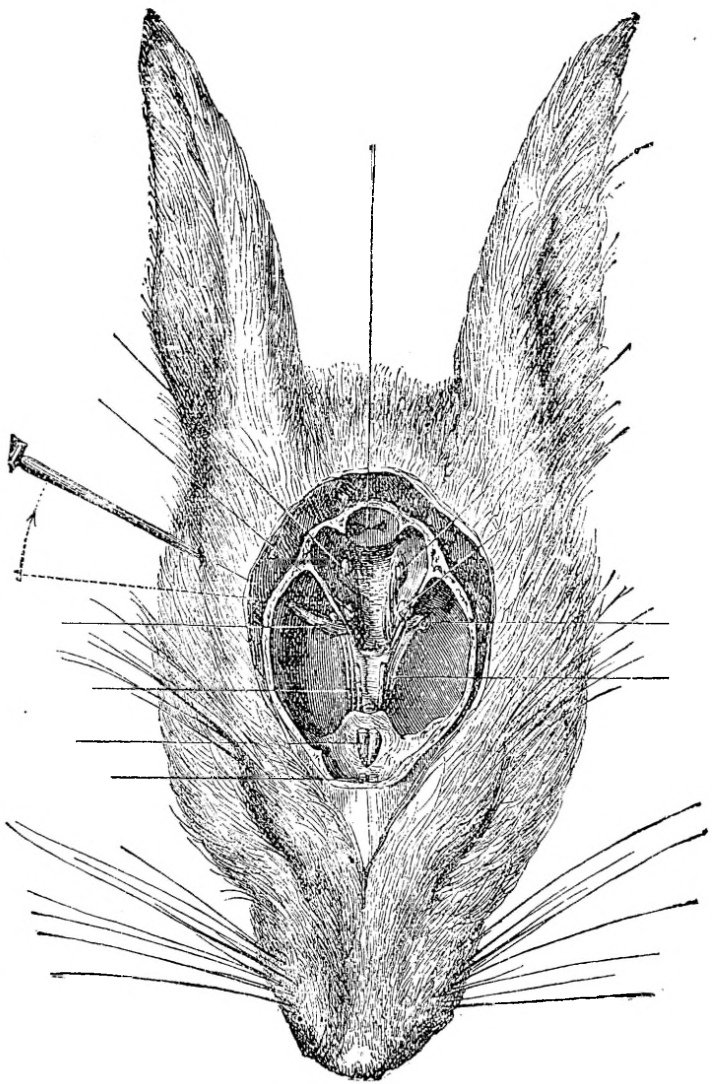
Paul Bert's *Pression Barométrique* p. 800.

"Let us come," says M. Bert in his large book on *La Pression Barométrique*, p. 800, "to the description of the convulsive attack (produced by placing the victim for hours under compressed oxygen). It is really curious and frightful *(effrayante)*.

"Let us take a case of medium intensity. When the animal is taken out of the machine it is generally in full tonic convulsions. The four paws are stiffened, the trunk is recurved backwards, the eyes are starting from the head, the jaws clenched. Soon there is a sort of loosening to which succeeds a new crisis of stiffenings with clonic convulsions, resembling at once a crisis of strychnine poisoning, and an attack of tetanus . . . Sensibility is preserved . .

"In lighter cases, instead of attacks so violent as this, one may lift the animal by one paw like a piece of wood, as Figure 61 shows. We observe disordered movements and local convulsions," &c.

The next figure shows the head of a dead rabbit, of which the brain and top of the skull is removed to show the position of the nerves, and the instrument is exhibited piercing the head and reaching the nerves (the trigeminus) on which it is desired to operate. The description given by Cyon of the method of operation (*Methodik*, p. 512) is as follows: "The rabbit is firmly fastened to the ordinary vivisecting table by means of Czermak's holder. Then the rabbit's head is held by the left hand, so that the thumb of that hand rests on the condyle of the lower jaw. This is used as a *point d'appui* for the insertion of the knife. . . . To reach the hollow of the temple the instrument must be guided forward and upward, thus avoiding the hard portion of the temporal bone and leading the knife directly into the cranial cavity. . . . . The trigeminus then comes under the knife. Now holding the head of the animal very firmly, the blade of the knife is directed backwards and downwards and pressed hard in this direction against the base of the skull. The nerve is then generally cut behind the Gasserian ganglion, which is announced by a violent cry of agony *(einen heftigen Schmerzensschrei)* of the animal."



Cyon's *Atlas*, Table xxxv.

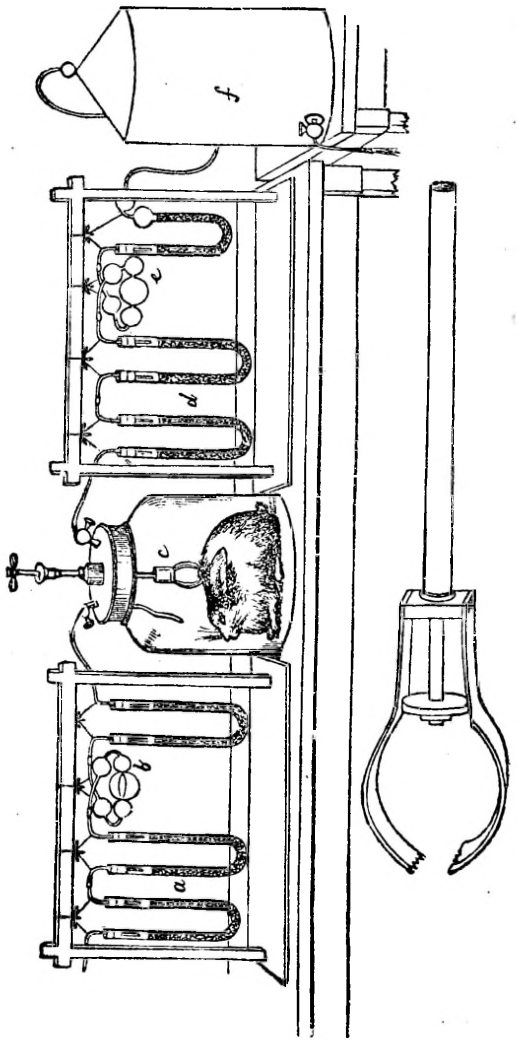
The experiments of Ferrier on monkeys and of Goltz on the brains of dogs, involve different mutilations, with scooping out of the brains till, in some cases, they resemble, as Goltz has said, a "lately-hoed potatoe-field."

Lastly, we arrive at an illustration (page 30) which cannot be quite classed with the preceding, having been (so far as I know) merely the private delight or toy (he avows he has used it *con molto amore*) of a single physiologist.

Signor Paolo Mantegazza, a brilliant Italian gentleman, and *Bel'uomo*, author of books of travels, of tender reminiscences of *La Mia Mammà;* of a treatise on "Good and Evil," and on the "Hygiene of Love"; set himself to study the physiology and philosophy of Pain, on which he afterwards composed a work, *La Fisiologia del Dolore* (Florence, Felice Paggi, editore, 1880) from whence we derive our information and our illustration. To study pain properly it was necessary, so Professor Mantegazza thought, to create the most intense pain he could possibly contrive; and with this object in view he devised various combinations. One, which he found excellent, consisted in "planting nails sharp and numerous, through the feet of the animal, in such a manner as to render the creature almost motionless, because in every movement it would have felt its torment more acutely" (*piantando chiodi acuti e numerosi attraverso le piante dei piedi in modo da rendere immobile o quasi l'animale, perchè ad ogni movimento avrebbe sentito molto più acuto il suo tormento*). Further on he mentions that, to produce still more intense pain (*dolore intenso*) he was obliged to employ wounds followed by inflammation.

Going a little further he devised, and, with the help of an ingenious machinist in Milan, brought into working order, the instrument depicted in our illustration, which is exactly reproduced from his book, p. 98. This machine enabled him to grip any part of an animal with pincers with iron teeth, and to crush, or tear, or lift up the victim, "so as to produce pain in every possible way." The first series of his experiments, Signor Mantegazza informs us, were tried on twelve animals, chiefly rabbits and guinea pigs, of which several were pregnant. One poor little creature, "far advanced in pregnancy," was made to endure *dolori atrocissimi*, so that it was impossible to make any observations in consequence of its convulsions. In the second series of experiments twenty-eight animals were sacrificed, some of them taken from nursing their young, exposed to torture for an hour or two, then allowed to rest an hour,

and usually replaced in the machine to be crushed or torn by the Professor for periods of from two to six hours more. In the table wherein these experiments are summed up, the terms *molto dolore* and *crudeli dolori* are delicately distinguished, the latter being apparently reserved for the cases when the victims were, as the Professor expresses it, *lardellati di chiodi* (larded with nails).



Mantegazza, *Del Dolore*, p. 98.

In conclusion, the author informs us (p. 27) that these experiments were all conducted *con molto amore e pazienza.*

Such are a few, out of scores of illustrations which might be added, of the practice of Vivisection which its advocates strive to make the British Parliament and public believe is almost wholly painless to the victims, and involves nothing more serious than "scratching a newt's tail" or "exhibiting a frog's foot under microscope."