Does science need secrecy? : A reply to Prof. Porter and others of Harvard medical school / By Albert Leffingwell... With statement concerning vivisection by Prof. W.T. Porter, reprinted from the "Boston transcript."

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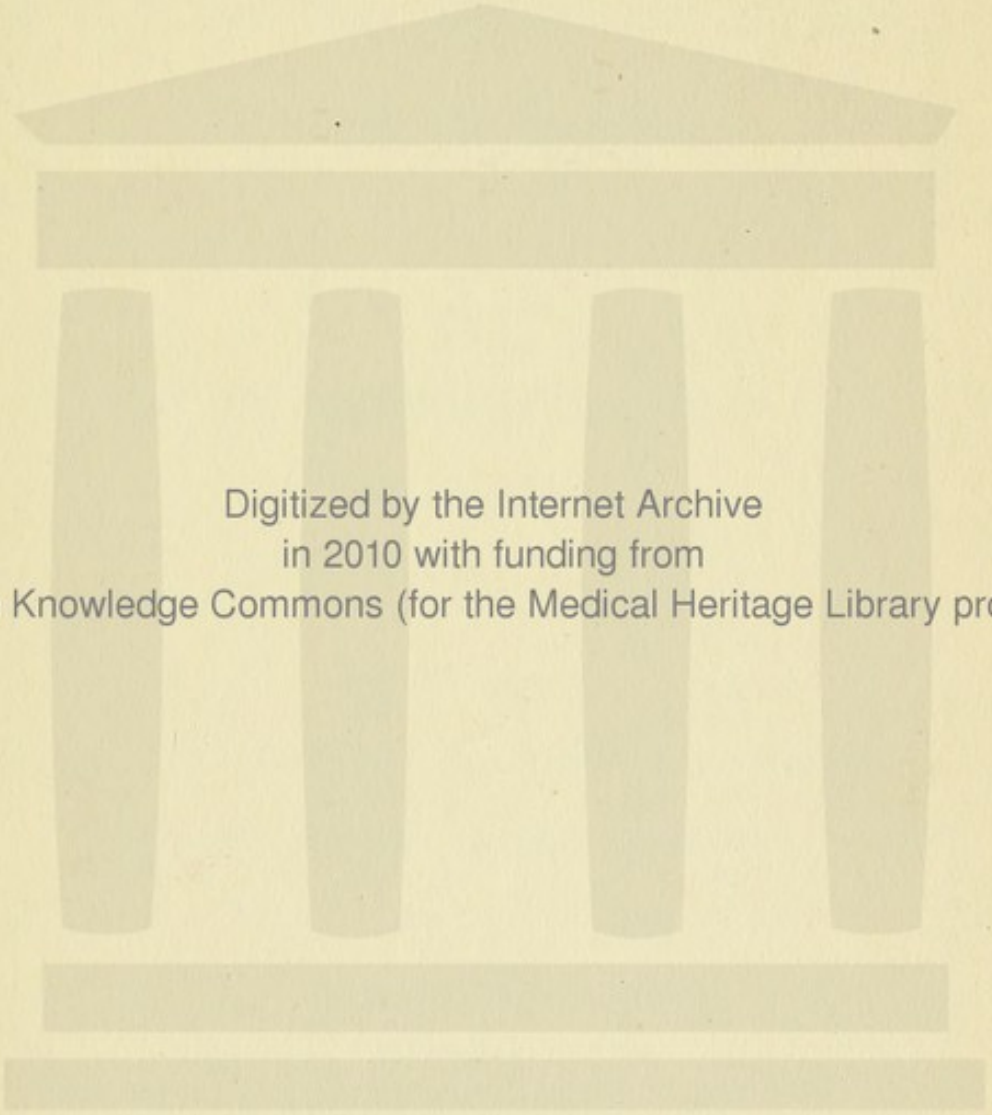

FIFTH THOUSAND.

Does Science need Secrecy?

A REPLY TO PROF. PORTER AND OTHERS

OF HARVARD MEDICAL SCHOOL.

BY

ALBERT LEFFINGWELL, M. D.,

CAMBRIDGE, MASS.

WITH STATEMENT

CONCERNING VIVISECTION BY PROF. W. T. PORTER,

REPRINTED FROM THE "BOSTON TRANSCRIPT."

PROVIDENCE, R. I.

1896.

DOES SCIENCE NEED SECRECY?

A REPLY TO PROFESSOR PORTER

BY

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To what extent can scientific authority be implicitly received as the foundation of belief regarding the subject of Vivisection? It is certain that for the great majority of men and women, all statements concerning it are wholly beyond the possibility of verification by personal experience. Regarding its extent or its methods, its pain or painlessness, its utility to humanity or its liability to abuse, the world bases its judgment, not upon knowledge, but upon faith in the accuracy, the impartiality, the sincerity of the men who, standing within the temple of science, know with certainty the facts. One might suppose that here was the welcome opportunity to demonstrate that science can have nothing to conceal; that her symbol is a torch and not a veil; and that above all professional preference and all partisan zeal stands fidelity to accuracy, and the love of absolute truth.

Nevertheless, it is my purpose in this paper to question the wisdom of too implicit faith; to suggest the expediency of doubt; and to point out why statements which may have the support of high scientific authorities, should sometimes be received with great caution and careful discrimination.

And yet I cannot see the slightest reason why everything that concerns a scientific method or purpose should not be plainly and accurately set forth. Generally

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The substance of this article was read before the Annual Meeting of the American Humane Association, Minneapolis, September 26, 1895, and was printed in the *Boston Transcript*, September 28, 1895.

this is the case. If a new telescope of unusual power is desired by a university, Wealth is not asked to give it in order that wealth may be increased by lunar discoveries. When an astronomical station is established on the Andes, or an expedition fitted out for the North Pole, we all know that science only will be the gainer — not commerce or art. The one exception to an almost universal rule, the one point where truth is veiled in obscurity for the public eye, is when we come to the vivisection of animals. Everywhere else science seems mindful of her mission, and asks only that with increasing radiance the light may shine.

Why should vivisection offer an exception to this ideal? That it seems impossible to tell the whole truth about it is evident to every person who understands the facts. The London *Lancet*, for example, recently praised a biography by Prof. Mosso, in which that Italian physiologist — as the *Lancet* remarked, "*wisely*" said, — "It is an error to believe that experiments can be performed on an animal which feels." A few weeks ago Professor Mosso sent me a manuscript copy of this same essay, in which the sentence appears in slightly different form: "It is an error to think that one can experiment on animals that have not lost sensation; the disturbance produced by pain in the organism of the animal is so great that it renders useless any observations." Now here is the utterance of a man of science, trained in the accuracy of the laboratory, occupying one of the foremost positions in Europe as a physiologist, and his words, stamped with the approval of the leading Medical journal of England, may presently be floating through the American press. How is the average reader to question a statement like this? Nevertheless, it is absolutely untrue. One *can* perform experiments "on an animal which feels;" they have been done by the thousand by Bernard, Magendie, Mantagazza, Brown-Sequard, and others; I have seen scores of these myself. No more unscientific sentence was ever written than this statement that one *cannot* do what is done every day! What the Italian physiologist might truthfully have written was this: "It

is an error to believe that physiological experiments, requiring the aid of delicate instruments, can be performed upon an animal which is not made incapable of muscular effort." If he had then gone on to say to what extent he effects this by means of anæsthetics, to what extent by the use of narcotics, and to what extent the poison of curare is administered to paralyze the motor nerves, leaving sensibility to pain untouched, we might have had a scientific statement of fact. As it is, we have — what? An untruth due to ignorance? An error due to carelessness? I do not know. Perhaps the physiologist was thinking too intently of his own special lines of inquiry to note the significance of his words; but what shall we say of a great scientific journal in England which could quote the untruth as "*wisely*" said? Is even verbal inaccuracy "wise" where science is concerned?

There was recently given out by Dr. William Townsend Porter, the assistant professor of physiology in Harvard Medical School at Boston, one of the most astonishing statements concerning vivisection that ever appeared in public print. The accuracy of Dr. Porter's statement was vouched for by five other leading professors in the same institution — Drs. Henry P. Bowditch, W. T. Councilman, W. F. Whitney, C. S. Minot and H. C. Ernst; men whose scientific reputation has imparted to their affirmations an immense authority throughout the country. They put forth what they asserted was a "plain statement of the whole truth" concerning experiments on living animals. He, perhaps, is a rash man who venturès to question any assertion supported by names like these. But it is the duty of every lover of scientific truth to point out errors wherever he may find them, no matter how shielded by authority or intrenched by public opinion; and I propose, therefore, to make use of this professional manifesto as an illustration of the fallibility of even the highest scientific expert testimony. I think it can be proven that although this declaration rests on such high authority, it is nevertheless permeated with mis-statement and error; that certain assertions have been made without due

authority, and certain facts of pith and moment most singularly omitted, or most carelessly overlooked. And if full reliance cannot be given to assertions made by men of the highest fame, then the whole question is as far as ever from permanent settlement.

I. In the first place Professor Porter does not well when he denies (as he seems to do) that the practice of experimentation upon living animals has ever led to abuse. "The cruelties practiced by vivisectors are paraded in long lists, with the assurance that they are taken directly from the published writings of the vivisectors themselves." Well, is this assurance untrue? "These long-drawn lists of *atrocities that never existed*," — can these be the words of a devotee of scientific truth? What does Professor Porter mean by them? What other meaning is possible for the average reader to obtain than that he intended to deny that atrocious experiments were anything but a myth? "Never existed?" Why, both in Europe and America, but especially abroad, I have personally seen most awful cruelty inflicted upon living animals, simply for the purpose of illustrating well-known facts or theories that had not the faintest conceivable relation to the treatment and cure of disease. No facts of history are capable of more certain verification than the tortures which have marked the vivisections of Magendie and Bernard, of Bert and Mantagazza, and of a host of their imitators. "It is not to be doubted that inhumanity may be found in persons of very high position as physiologists; we have seen that it was so in Magendie." This is the language of the report on vivisection by a royal commission, to which is attached the name of Professor Thomas H. Huxley. Says Dr. Eliotson, in his work on Human Physiology (p. 448), "I cannot refrain from expressing my horror at the amount of torture which Dr. Brachet inflicted. *I hardly think knowledge is worth having at such a purchase.*" But take American testimony on this point. Dr. Henry J. Bigelow, for many years the professor of surgery in Harvard Medical School, of whom Dr. Oliver Wendell Holmes has said, that he was "one of the first, if

not the first, of American surgeons," gave the annual address before the Massachusetts Medical Society a few years ago. Therein he called attention to the "dreadful sufferings of dumb animals, *the cold-blooded cruelties* now more and more practiced under the authority of science! . . . Watch the students at a vivisection. It is the blood and suffering, not the science that rivets their breathless attention. . . . It is dreadful to think how many poor animals will be subjected to excruciating agony as one medical college after another becomes penetrated with the idea that vivisection is a part of modern teaching; that to hold way with other institutions they, too, must have their vivisector, their mutilated dogs, their chamber of horrors and torture to advertise as a laboratory." Does any one imagine that Dr. Bigelow here refers to "atrocities that never existed?"

The American Academy of Medicine includes within its membership men who are as well informed as any in the medical profession. At the sixteenth annual meeting, held in Washington four years ago, Dr. Theophilus Parvin, one of the professors in Jefferson Medical College of Philadelphia, gave the Presidential address. Speaking of physiologists, he says that there are some "who seem, *seeking useless knowledge*, to be blind to the writhing agony and deaf to the cry of pain of their victims, and who have been guilty of the most damnable cruelties without the denunciation by the public that their wickedness deserves and demands; these criminals are not confined to Germany or France, *but may be found in our own country*." Is this the statement of an "agitator?" Well, President Parvin graduated as a physician some years before Dr. Porter was born, and I fancy that he knows of what he speaks. And that physiological experimenter who, defending the utility of vivisection, forgets or denies the existence of atrocity, may be on dangerous ground. Cases have been known where merciless occupation has induced an atrophy of the sense of pity; and its first symptom is unconsciousness of cruelty, and blindness to abuse.

II. But quite as strange as any assertion in this

"plain statement of the whole truth" is the implied suggestion that abuse is impossible because everything is so openly done! "These loud outcries to put an end to the frightful scenes daily enacted within the open doors of the most enlightened institutions of learning," — surely there is a false impression conveyed by these words which their writer should hasten to correct. "*Within the open doors!*" To whom are the doors of the physiological laboratories open? Why, no feudal castle of the middle ages was ever more rigidly guarded against the entrance of an enemy than physiological laboratories are secured against the admission of unwelcome visitors. To some of the largest laboratories in the United States, no physician even, can gain entrance unless personally known. If the Bishop of Massachusetts and the editor of any leading newspaper in the city were to apply for admittance at Professor Porter's laboratory during a vivisection, would the doors swing open as to welcome guests? Would they be invited to come again and as often as desired, without previous notification? I commend the experiment. Of course a certain degree of this seclusion is necessary and wise. That which I criticise is the implied denial that any secrecy exists and this reference to "open doors." And if doubt still lingers in the minds of any who read, a conclusive experiment will not be difficult to make. Let him but knock at these "open doors" when vivisection is going on.

III. We are informed, too, by these scientific authorities that by so simple a method as "a scratch on the tail of an etherized mouse" and subsequent treatment, "the priceless discovery was made which has at length banished tetanus from the list of incurable disorders." That is an unscientific statement simply because it is untrue. Tetanus, or lockjaw, was never in "the list of incurable disorders" — if uniform fatality is meant; and it certainly has not been taken out of the list by any "priceless discovery" whatever. Consult Aikin, Wood, Fagge, Gross — consult any medical authority whatever of ten years ago — and you find the recoveries from tetanus averaged at that time from

ten to fifty-eight per cent. of those who were attacked. Now, what mighty change has been wrought by the "priceless discovery?" Well, I take up the *London Lancet* of Aug. 10, 1895, and I find an English physician tracing "all procurable published and unpublished cases of tetanus treated by anti-toxine," and they number just thirty-eight, of which twenty-five were recoveries and thirteen were deaths. I take up the New York *Medical Record* for Aug. 24, 1895, and I find a correspondent stating that he "can discover in the recent medical literature but six or seven cases in all where anti-toxine or tetanine has been used successfully, and they were all by foreigners." To call that a "priceless discovery," which is not in general use to-day, which in four years has made no better record than this, and with which the report of hardly a single cure can be found in American medical annals within the last five years, — is *that* a scientific statement? Is it worthy of the reputation of men who allowed it to go forth to the world backed by the eminence of their names?

IV. "It is asserted," says Professor Porter, "that living animals, without narcotics, helpless under the control of poisons which, it is alleged, destroy the power to move while increasing the power to suffer, are subjected to long, agonizing operations, in the hope of securing some new fact, interesting to the scientific mind, but without practical value." This is one of the most curious and ingenious sentences I have ever read. Its inaccuracy depends on only two words, "without narcotics." No critic of vivisection ever made use of those words in any such statement; and I respectfully challenge Professor Porter for reference or quotation. It cannot be given.

But, if instead of the words "without narcotics," Professor Porter had written "without anæsthetics," then he would have made a precise, accurate and true statement of what undoubtedly has been charged. Could any reader imagine that such a charge was true, and that it might exactly apply to some operations carried on in the laboratories of Harvard Medical School? "Helpless under the

control of poisons which destroy the power to move, while increasing the power to suffer," writes the physiologist, in seeming amazement at the mendacity that could coin such a wicked lie! Yet that statement is entirely true. The name of that poison is curari or woorara; the orthography is by no means fixed. "Woorari," says Dr. Ott (who has personally made use of it in the physiological laboratory at Harvard Medical School), "is able to render animals immovable . . . by a paralysis of the motor nerves, *leaving sensory nerves intact*." The properties of this singular poison have been carefully investigated by Claude Bernard, whose work on experimental science may be seen at the Boston Public Library. "Le Curare," he says, "detruit le mouvement, en laissant persister la sensibilite" (p. 298); "Curare destroys the power of movement, although sensibility persists." Under the influence of this agent the animals upon which the physiologist may be working are "exactly as if solidly fixed to the table, are in truth chained for hours" (p. 310). Does it know what is going on? "When a mammal is poisoned by curari, its intelligence, sensibility or will power are not affected, but they lose the power of moving" (p. 296). Do they suffer? Is it true, this statement which Professor Porter tells us is "asserted," but which he does not — except by innuendo — deny, that animals are "helpless under control of poisons which destroy the power to move, while increasing the power to suffer?" Well, Claude Bernard was one of the greatest physiologists of this century, and he shall tell us. Death by curare, he says, although it seems "si calme, et si exempte de douleur, est au contraire, accompagnee des souffrances les plus atroces que l' imagination de l' homme puisse concevoir,"— sufferings the most atrocious that the imagination of man can conceive! "In that corpse without movement and with every appearance of death, sensibility and intelligence exist without change. The cadaver that one has before him *hears and comprehends what goes on about him, and feels whatever painful impressions we may inflict*." (p. 291) Is an animal ever "*curarized*" in the Harvard Medical School? We shall presently see.

V. Throughout the entire manifesto the word "narcotics" is constantly used apparently as a synonym for "anæsthetics;" we read for instance of "a rabbit narcotized with chloral," a "narcotized dog," etc., but not once of an "anæsthetized" animal. Let us see exactly what these terms indicate.

In the physiological laboratory five different substances are largely employed for producing certain effects in animals used for experiment. Of curare I have just spoken. Chloroform and ether are known as "anæsthetics;" that is, agents which, pushed sufficiently far, produce a degree of the most absolute insensibility to pain. But the trouble with these anæsthetics in the laboratory is their liability to cause the sudden death of the animal experimented upon; and this is often most annoying and inconvenient. The temptation therefore is great to substitute for these anæsthetics certain "narcotics" which create a degree of torpor, though they do not prevent pain. Opium (or morphia) and chloral are the agents thus used. An animal treated with either may be said to be "narcotized." But is the creature thus narcotized, sensitive to the pain of cutting, for example? Take opium. Claude Bernard, the great French physiologist, asserts that sensibility exists even though the animal be incapable of movement; "il sent le douleur, mais il a, pour ainsi dire, perdu l'idee de la defense;" he feels the pain, but has lost, so to speak, the idea of defending himself. Do surgeons use morphia to prevent the pain of a surgical operation? Or take chloral. It is a narcotic; it tends to produce sleep. Is it an anæsthetic? Dr. Farquharson of St. Mary's Hospital says in his "Guide to Therapeutics" (p. 195): "Recent observation goes to show that *chloral is in no sense a true anœsthetic*. . . . Chloral having no influence over sensory nerves, has no power, *per se*, of allaying pain." Dr. Wood of Philadelphia seems disposed to think that "in very large doses" chloral will produce insensibility to pain; but he adds that unless the amount employed be so large as to be almost poisonous, "this anæsthesia is in most cases very trifling."

For use in the physiological laboratory, the dose for a rabbit is fifteen grains, or one gramme. What shall we say of most painful experiments upon rabbits, "lightly chloralized" with one-tenth the ordinary dose? Such investigations were made by Professor Porter himself, at the Harvard Medical School, and within the last two years.

VI. And this brings me to a point upon which I am loth to touch, since it would seem to involve the most positive contradiction of statements made by scientific men of the highest authority. Speaking in the plural number for his five associates, Professor Porter has said of vivisections causing pain, that "such investigations are rare. *None such have been made in the Harvard Medical School within our knowledge.*" This assertion has been widely copied, and is almost universally believed. The Boston *Transcript* doubtless echoed the sentiment of the public when it declared in its editorial columns that "the character and standing of the medical men whose names are given as responsible for this explanation to the Boston public forbid any questioning of its statements of facts." What is the value of authority if one may assume to disbelieve in a case like this? Here is the assertion of six scientific teachers. For the general public, nothing would seem to remain but unquestioning acceptance, and implicit belief.

But a great English thinker has said that doubt is the very foundation of science, since "without doubt, there would be no inquiry, and without inquiry, no knowledge." In the interests of scientific truth, I venture here, to suggest doubt rather than credulity. We have an assertion which is either true or false. I doubt its truth. I affirm that evidence exists that experiments have been made in Harvard Medical School under the following circumstances:

1. Animals have been "*curarized*," and in that condition vivisected. Curare is not an anæsthetic, but simply prevents the animal from moving, while remaining entirely sensible to pain.

2. Animals have been "very lightly narcotized" and in that condition vivisected. There is no evidence that animals "lightly chloralized" are insensible to pain.

3. In the majority of published accounts of experiments, there is no mention whatever of anæsthetics being used. In a few instances only, there is reference to the administration of ether before the preliminary cutting, often followed later by use of *curare*.

4. The majority of these published investigations, so far as I have been able to discover, relate to curious questions in physiology, and have no perceptible relation to the treatment or cure of human ailments.

For proof of these statements I refer to the published accounts of various experimenters themselves, concerning their own investigations. Most of them may be found in somewhat rare volumes entitled, "Collected Papers, Physiological Laboratory of Harvard Medical School."

1. Dr. Ott on the Action of Lobelina. "The number of my experiments was six, and all were made on rabbits. . . . Into the left jugular had been bound a canula, through which the poison was injected toward the heart. (Exp. I.) *As the injection of the poison caused struggling . . . I used curare to paralyze the motor nerves.* (Exp. II.) Rabbit, curarized, vagus irritated. (This experiment lasted thirty minutes.) From another series, we may quote the Exp. VIII. Dog; vagi and sympathetics cut; artificial respiration, etc.

"The above experiments were made in Professor Bowditch's laboratory at Harvard Medical School." There is no mention of anæsthetics.

2. Dr. Ott on the Action of Thebain. "In all cases of poisoning by thebain, the functions of the sensory nerves remain unimpaired till death, as convulsions are always excited by touch, up to that period." (p. 5.) "I have made use of the beautiful method of Brown-Sequard in cutting off the action of the poison on the lower segment of the spine," etc. "The experiments on the circulation were twenty-six in number and were made on rabbits. . . . Artificial respiration was kept up. . . . *Curare* was used." Dr. Ott makes no mention of anæsthetics.

"It is well known," says Dr. Ott, "that the irritation

of a sensory nerve causes an excitation of the vaso-motor centre, which is indexed by a rise of pressure. The following experiment was made: Ludwig's gimlet electrodes were screwed into the atlas and occiputal bone (the skull of a rabbit) for direct irritation; vagi cut; *curare;* sciatic nerve prepared; vaso-motor centre irritated through a sensory nerve three seconds; directly irritated for eleven seconds." The entire experiment lasted twenty-five minutes; the pressure rose from 150 to 186 and 198. Dr. Ott adds: "As indirect irritation always produces a rise of pressure, *the sensory nerves and the conductors of their impressions are not paralyzed.*" (p. 12.) Will someone assert that this was a "painless" experiment? Where was it done? "The above experiments were made in the physiological laboratory of Professor Bowditch at the Harvard Medical School."

3. Dr. Walton on the Epiglottis. Case IX. "Dog; epiglottis excised; watched six days; coughed at almost every attempt to eat or drink. Case X. Large dog; epiglottis excised; observed twenty-one days; choked in swallowing liquids and solids at every trial." "The experiments were performed in the laboratory of Harvard Medical School." A dog, strangling in all attempts to swallow food for a period of three weeks can hardly be said to undergo "a painless experiment."

4. Dr. Hooper's Experiments. "The following experiment was made in order to ascertain whether an upward movement of the cricoid cartilage was necessarily associated with increased capacity of the larynx." Small dog; curarized; artificial respiration; pharynx plugged; a cord tied around the head and jaw in front of the ears to compress the cotton and the passages leading upward. Trachia divided; a tubulated cork secured in upper end. "It may be questioned certainly how far an experiment of this kind can be applied to the living human larynx, or with what logical justice we can draw conclusions from it." "The experiments recorded in this paper were performed in the physiological laboratory of Harvard Medical School." Of another series of ninety-four experiments upon nine different dogs, it is

stated that they were etherized "during the early part of the operation." If one desires to see the picture of a dog "thoroughly etherized or chloralized," fastened immovably, its throat cut, and its larynx dissected out and tied up with a string — an experiment from the physiological laboratory of Harvard Medical School — let him consult one of Dr. Hooper's papers.

5. Vaso-motor Experiments upon Frogs, by Dr. Ellis. "All the frogs were *curarized*. . . . The sciatic nerve laid bare and cut in the upper part of the thigh." Dr. Ellis tells us that "many frogs were used;" that "different frogs vary greatly in their susceptibility to different forms of electrical irritation;" that "each animal is a law unto itself;" that "the individual peculiarities of different frogs and the varying conditions to which they are subjected add perplexing elements to the problem;" that "very delicate apparatus was employed;" that in some instances a "curious result was obtained by striking the abdomen rapidly for a short time, causing the force of the heart-beats to much diminish;" that sometimes the little creature's heart becomes "enormously swollen with blood, as shown by the great rise in the lever;" that shocks were "given once every second" in certain cases, and that "very beautiful records can be taken." No doubt; no doubt. All this may be interesting to the physiologist; but what practical results were obtained? "We cannot believe," says the Harvard manifesto, "that such inquiries are ever taken without . . . the conviction that the benefit to humanity will far outweigh whatever suffering they may cause to the animals." These are beautiful words! Let Dr. Ellis state the results of his own experiments in his own way: "The results of our experiments point to the existence of a vaso-dilator as well as a vaso-constrictor mechanism *in the frog!*" That is all. The "benefit to humanity" was about as much as would come from the discovery of a silver mine in the moon.

6. Dr. Bowditch's Experiments on the Vaso-motor Nerves. "After some preliminary experiments on other animals, it was decided to employ cats in this research, since

adult cats vary less than dogs in size, and are much more vigorous and tenacious of life than rabbits or other animals usually employed in physiological laboratories. *The latter point is one of considerable importance in experiments extending over several hours.* The animals were *curarized* and kept alive by artificial respiration, while the pheripheric end of the divided sciatic nerve was stimulated by induction shocks, varying in intensity and frequency. . . . The experiments were so prolonged that it seemed important to give to the air thrown through the trachial canula into the lungs a temperature as near as possible to air respired through the natural channel. . . . "The cat to be experimented upon was first etherized by being placed in a bell-glass with a sponge saturated with ether, and then secured, "the head being held in an ordinary Czermak's rabbit-holder. The sciatic nerve was then divided. In some cases the cat was allowed to recover from the effect of the ether, and the experiment postponed some days; in others, a half-per-cent solution of curare was put into the circulation while the animal was still etherized." (The effect of the curare would be to render the animal motionless, after recovery from the ether; it has no other use.) In all, there were 909 observations made upon "about seventy cats."* In one experiment "a tetanic stimulation was applied for fifteen minutes to the sciatic nerve. The result was a constriction steadily maintained during continuance of the irritation." If there were any results for "benefit of humanity" in these investigations, they are not recorded. These experiments were made at Harvard Medical School; and I submit that they were by no means "painless."

7. Dr. Bowditch's Experiments on Nerves. These were made upon cats "in the laboratory of Harvard Medical School." "The animals were kept under the

* In the *Boston Transcript* of Feb. 10, 1896, the Dean of Harvard Medical School was reported as denying that cats were used for vivisection, and as affirming that although connected with the School since his graduation he had "never seen or heard of a cat being in the building." It is indeed strange that the fame of Dr. Bowditch's researches upon these "seventy cats" did not even reach his associate in the same building!

influence of a dose of *curare* just strong enough to prevent muscular contractions; while artificial respiration was maintained, and the sciatic nerve constantly subjected to stimulation sufficiently intense to produce in unpoisoned animals, a tetanic contraction of the muscles. In this way it was found that stimulation of a nerve lasting from one a half to four hours (the muscle being prevented from contracting by curare) did not exhaust the nerve." The foregoing quotation is from an address given before the American Association for Advancement of Science, August, 1886 — nine years ago. If any great "benefit to humanity" has resulted from them, it has not yet been made public. Were these experiments "painless?"

8. Dr. Ernst's Researches into Rabies. In the "American Journal of Medical Sciences" for April, 1887, there appears an account of certain investigations into the nature of rabies and hydrophobia, made by Dr. Harold C. Ernst of the Harvard Medical School. Some thirty-two rabbits were inoculated with rabies, and all of them died of this terrible disease. Without touching upon the question of utility in this particular instance, I submit that by his own account of these investigations, they were by no means "painless."

9. Experiments of Prof. Porter on the Spinal Cord. In the "Journal of Physiology" for April 6, 1895, appears a long and elaborate article on the "Path of the Respiratory Impulses," by Professor William Townsend Porter, of the Laboratory of Physiology in the Harvard Medical School, the author of the preceding manifesto. Taken in conjunction with his assertion regarding painful vivisections that "none such have been made in Harvard Medical School within our knowledge," this paper would seem to offer a very curious and significant illustration of scientific forgetfulness. The object of Professor Porter's experiments was the confirmation of a purely physiological hypothesis; one which had no reference whatever to the cure or treatment of human ills. His researches embraced at least sixty-eight experiments, and full details of fifteen

are given in this essay. In seven of these fifteen experiments — all involving most painful mutilations — light doses of morphia or chloral were administered instead of anæsthetics; in one experiment the dose is not given, and in another there is no mention of any "narcotic" of any kind. Even when ether was given, it was not as a rule used throughout the experiment. Some examples will be of interest; the italics are mine.

"I have separated the cord from the bulb in eight rabbits and six dogs, all fully grown. . . . Artificial respiration was kept up a long time. . . . The animals were all *very lightly narcotized.*"

Exp. I. Dec. 19, 1893. "The fourth ventricle was laid bare in a large, *lightly chloralized* rabbit, and the floor of the left side of the medium line burned away with small hot glass beads. Respiration continued on both sides in spite of repeated cauterizations."

Exp. II. Dec. 15, 1893. "Most of the left side of the floor of the left ventricle of a rabbit, *lightly chloralized*, (not over 0.1 g.), was burned away." (*This was one-tenth the usual dose of chloral.*)

Exp. XXIII. Feb. 27, 1894. Dog narcotized with morphia. Cervical cord exposed its entire length; severed at the sixth cervical vertebra, and the posterior roots of the cervical nerves cut. (An exceedingly painful experiment.)

Exp. LXVI. Nov. 20, 1894. Rabbit, "*lightly narcotized* with ether." Left phrenic nerve "was seized near the first rib and torn out of the chest." . . . "I have made such experiments on thirteen rabbits and one dog, and the result has *always been the same.*" A beautiful engraving gives the respiratory curve of this rabbit, "the left phrenic nerve of which had been torn out. . . . *The stars denote struggling.*"

Exp. LI. May 3, 1894. "At 10.30 a middle-sized dog received 0.2 g. morphia. Half an hour later, the left half of the spinal cord was severed. . . . Animal being loosed, showed a paralysis on the left side. . . . At

4.30 the dog was bound again and the abdomen opened."

Why was the dog "bound again?" No mention of "narcotic" or anæsthetic during further steps of the experiment.

Exp. XXV. Mar. 3, 1894. Dog; given 0.15 grammes morphia sulphate; tracheotomized, spinal cord severed at sixth cervical vertebra; artificial respiration.

Exp. XLIX. May 1, 1894. "At 10 A. M. the left side of the spinal cord of a rabbit, narcotized with ether, was cut. . . . At 4 P. M., 5½ hours after, breathing was bilateral. . . . On opening the abdomen . . . diaphragm was once more exposed and cut in two pieces." . . . (No mention of anæsthetic or narcotic during latter half of experiment, "5½ hours later.")

Exp. LII. May 4, 1894. Spinal cord of rabbit narcotized with ether, cut on left side. . . . Seven hours later he was in good condition and *kicked vigorously as he was again put on the board.* The abdomen opened in the median line . . . phrenic nerve was now cut, etc." There is no mention of narcotic or anæsthetic during the latter part of the operation, "seven hours later" when the rabbit "was again put on the board," kicking vigorously, to have its abdomen opened.

Exp. LVI. May 14, 1894. Rabbit, etherized and tracheotomized. Spinal cord cut; artificial respiration; "The narcotic was stopped. On turning the rabbit and opening the abdomen," etc. Why was not the abdomen opened before "the narcotic was stopped?"

Exp. LXI. Nov. 8, 1894. The right half of the spinal cord of a full-grown rabbit was severed . . . the phrenic nerve cut . . . artificial respiration, etc." There is no mention whatever of either narcotic or anæsthetic being used in this experiment.

"Other experiments could be added, but they seem unnecessary," says Professor Porter. We agree with him.

There are few laboratories in Europe better equipped for vivisection than the scene of all these experiments. In one of his works, Dr. Ott pays a tribute to the inventive genius

of Prof. Henry P. Bowditch of Harvard Medical School, who, it seems, has contrived a new device for holding immovably the head of an animal to be vivisected. "It consists of a fork-shaped iron instrument, the points of the fork united by an iron bar . . . which is passed behind the canines (teeth) and bound fast by a strong cord which is fastened over the jaws. When the iron rod is fastened to the prongs, the handle is inserted into the screw-sliding points of the upright rod of a Bernard holder," in which device certain straps prevent the dog "from retracting his nose." But how can a dog retract his nose if insensible? Why should he wish to retract his nose if he is suffering nothing? "I sometimes fear," said Dr. Theophilus Parvin in his address before the American Academy of Medicine, "that this anæsthesia is frequently nominal rather than real; else why so many ingenious contrivances for confining the animal during operations, contrivances that are not made use of in surgical operations upon human beings?"

These were Boston vivisections. They were not done thousands of miles away in some distant European laboratory, but here at home. Should they have been left in the quiet secrecy of physiological literature? Then assuredly their existence ought not to have been explicitly denied.

What judgment are we entitled to pass upon this manifesto? Was it, indeed, what it claimed to be—"a plain statement of the whole truth?"

No. A "statement of the whole truth" would not have carefully mentioned "a scratch of the tail of an etherized mouse," and made no reference to other investigations of infinitely greater import carried on in their own laboratory. A statement of the whole truth would not have spoken of "long-drawn lists of atrocities that never existed"—denying in one sweeping sentence some facts as certain as any in history. A statement of the whole truth would not have referred to "narcotics" as though they were identical with "anæsthetics;" it would not have left hidden the use and purpose of curare; it would not have referred to "open doors," when there are no open doors; it would not have

proclaimed to the public as a "priceless discovery" for the cure of tenanus, an agent of which not five cases of successful employment in this country can be found in medical literature. And above all, a plain statement of the whole truth would never have declared that no painful vivisection had been made in Harvard Medical School "within *our* knowledge," in the face of the evidence I have given in this paper.

I am not an anti-vivisectionist, for I believe in the practice, when it is rigidly guarded against all abuses, limited to useful ends, and subject to public criticism and the supervision of the law. But I cannot believe that science ever advances by equivocation or gains by secrecy. If, in the opinion of scientific experts, certain phases of vivisection can only go on by being concealed and kept from the world's judgment and criticism, then I fear the time may come when society will question the expediency of all such methods, not because they are invariably useless, not because they are always cruel, but from higher considerations than those that affect man's relations to the animal world. For science can exist without more vivisection; but there are some things without which society itself cannot exist.

(From the Boston Evening Transcript, July 13, 1895.)

CONCERNING VIVISECTION.

BY

WILLIAM TOWNSEND PORTER, M. D.,

Ass't Professor of Physiology, Harvard Medical School.

[THE FOLLOWING STATEMENT IS MADE AT THE SUGGESTION OF DR. H. P. BOWDITCH, DR. W. T. COUNCILMAN, DR. W. F. WHITNEY, DR. C. S. MINOT AND DR. H. C. ERNST, PROFESSORS IN THE HARVARD MEDICAL SCHOOL, IN ANSWER TO MANY REQUESTS FOR INFORMATION WITH REGARD TO EXPERIMENTATION ON LIVING ANIMALS.]

Readers of the daily prints are aware that a few misinformed individuals are making a persistent effort to bring about a popular agitation against the experimentation on living animals. The newspaper letters and other communications put forth by these persons dispute the necessity of vivisection, affirming that the knowledge secured by this means is not essential to the progress of biology, and therefore without substantial value for medicine, a department of general biology on which the public welfare and the happiness and prosperity of every citizen depend.

It is charged that experimental studies of the functions of living animals have no purpose save the gratification of an ignoble ambition, or the satisfaction of an idle and vicious curiosity. It is asserted that living animals, *without narcotics*, helpless under the control of poisons which, it is alleged, destroy the power to move while increasing the power to suffer, are subjected to long, agonizing operations in the hope of securing some new fact, interesting to the scientific mind but without practical value. The cruelties practiced by vivisectors are paraded in long lists, with the assurance that they are taken directly from the published writings of the vivisectors themselves, and distressing pictures are drawn of the work of eminent professors in great universities. In short, an organized effort is making to persuade the uninformed that men who spend their lives in laying the broad and deep foundations on which alone a rational medicine can rest are wanting in common humanity, and that the medical profession, whose work it is to lessen the suffering in the world, looks with indifference on useless and truly revolting cruelties *done before its very eyes.**

It is true that the evident exaggeration of these charges will alone discredit them with many who have no special knowledge of the procedures so fiercely attacked, and who therefore cannot perceive that *the weapons of these agitators are garbled facts, downright perversions, and misleading excerpts* from professional writings beyond the comprehension of the untrained. It is true that the public mind will hardly be persuaded

* The italics in this paper are not in the original. They are herein employed not for emphasis, but merely to indicate certain inaccurate affirmations or suggestions to which the especial attention of the reader is directed.

that teachers in medicine have less mercy towards dumb animals than men of other callings. And yet these reiterated charges of cruelty, *these long drawn lists of atrocities that never existed*, these loud outcries to put an end to the *frightful scenes daily enacted within the open doors of the most enlightened seats of learning*, absurd though they be, do positive harm. The least of the evil that they do is that they publicly attack the character of investigators and teachers in the medical profession; the greatest, that they seek to destroy the freedom of learning, and to make impossible that patient search for fundamental truths which has raised medicines from the slough of empiricism to the level of an applied science. It is the duty of medical men to meet these mischievous attacks by A PLAIN STATEMENT OF THE WHOLE TRUTH.

Experiments on living animals may be divided into three classes. In the first class may be placed those experiments in which the animal is narcotized before the operation is begun and is killed while still insensible to pain. This class includes almost all vivisections in physiology, *i. e.*, almost all experiments which determine directly the functions of living organs, and almost all pharmacological experiments, those which determine the action of remedies on living organs. An example is the cutting of the pneumogastric nerve in the rabbit, fully narcotized with chloral, in order that the action of this nerve upon the respiration may be studied.

The second class consists of experiments in which the operation is made during full unconsciousness and the animal then allowed to recover. The following illustrations will make plain the purpose of such work. In a narcotized dog an opening is made through the abdominal walls into the stomach and a short silver tube inserted. The narcotic is stopped. In a few days the wound heals completely. The pain of the wound is usually so slight that even the appetite of the dog is not affected. Very exceptionally the wound takes an unfavorable course. In such cases, the dog, if seen to be suffering, is killed. This opening into the stomach enables the physiologist to determine with much accuracy the digestibility of foods, the nature and the amount of absorption from the stomach, the length of time that food remains in this organ, the effect of remedies upon its functions, and many other matters of the first importance. A second illustration is found in the experiments of the pathologist. A narcotized rabbit is inoculated with the virus of hydrophobia and the symptoms of the disease thus induced are carefully noted. The knowledge thus secured enables the pathologist to decide whether a dog which has been killed after biting several persons in a paroxysm of supposed madness was really rabid. If the dog was mad indeed, the inoculation of an animal with a small portion of the dog's spinal cord brings on the previously determined characteristic symptoms of the disease. The fact of rabies is thus made certain, and there is still time, so slowly does the rabies develop in the human species, to save the lives of the bitten persons by inoculation with the attenuated virus. Yet another illustration. The bacteriologist *makes a scratch in the tail of an etherized mouse*, touches the scratch with a wire covered with the germs of tetanus (lockjaw), and learns the course of the disease in this animal. He then endeavors, by the injection of various substances, to arrest the fatal march of the disease. It was in this way that the *priceless discovery was made which has at length banished tetanus from the list of incurable disorders.*

The third class of vivisections is that in which no narcotic is given. Many operations require no anæsthetic because they inflict little or no pain. An example is the injection of diphtheria toxine into horses, in order that the serum of their blood may be used to destroy the diph-

theria bacillus in the very tissues of the sick. Other operations of this class *do cause pain*. Painful vivisections, when made at all, are made for the sake of determining functions that are temporarily suspended by narcotics. Here truth is gained at the expense of suffering because there is no other way. *Such investigations are rare. None such have been made in the Harvard Medical School within our knowledge.* We cannot believe that such inquiries are ever undertaken in any university without the most careful consideration of their probable value and the conviction that the benefit to humanity will far outweigh whatever suffering they may cause to the animals employed.

It is asserted that vivisection is not necessary. This we deny. Vivisection is the unavoidable consequence of two incontrovertible propositions: the first, that there can be no adequate knowledge of the whole without adequate knowledge of the parts which compose the whole; the second, that the functions of the complex organs which compose the higher vertebrate, cannot be clearly made out by the study of dead organs or by the observation of the non-vivisected animal. It would be easier to create the science of strategy from observations on dead soldiers than to reproduce the present knowledge concerning the circulation of the blood from a study of the dead blood-vessels. Whole series of phenomena are hidden alike from the student of lifeless tissues and from the outside investigator who confines himself to man or the non-vivisected animal. Thus, the work done by every organ in the body depends on the quantity of blood with which it is supplied, and this depends, other things being equal, on the pressure of the blood within the arteries. No means exist of measuring accurately the pressure of the blood in men or non-vivisected animals. Only when the measuring apparatus is connected directly with the blood-vessels of the living animal can any certain knowledge concerning one of the most important factors in the life of the organism be secured. So the fundamental problem of the distribution of the blood can be solved only by vivisection.

Instances of the practical value of the knowledge gained by vivisection are almost numberless. The discovery of the restraining action of the pneumogastric nerve upon the heart disclosed a previously unsuspected attribute of nervous tissue, *threw a searching light far into the gloom* and still enshrouds the higher functions of the brain, and *left an ineffaceable mark on practical medicine*. This discovery was solely the fruit of vivisection. It is now but twenty-five years since the physiologist Hitzig stimulated certain areas on the exposed brain of a narcotized dog and observed that each stimulus caused a particular group of muscles to contract. This experiment has *given a mighty impulse* to the diagnosis of cerebral disease, has opened the almost superstitiously dreaded brain to the surgeon's knife, and has rescued many who once were thought beyond the reach of art.*

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*The latest statistics regarding brain-surgery are of interest to the medical profession. In an address before the New York State Medical Society, January 29, 1896, Dr. M. Allen Starr gives the results of operations for brain tumor so far as recorded in the medical literature of this country and Europe up to January 1, 1896. There have been, it seems, 162 cases operated upon, in 72 of which the tumor was removed, and the patient recovered. In 90 other cases the tumor was either not found or the operation was a failure. Dr. Starr points out that only about one case in fourteen is open to operation; and with the final result of operations for the cure of epilepsy, about which we heard so much a short time ago, he is "exceedingly disappointed."

It is not to be disputed that the certain cure of any sick man depends on the accurate determination of his disease. It cannot be denied that a clear conception of the normal functions of a part is the necessary basis for the recognition of the abnormality of function which constitutes disease. It follows that the cure of disease must be founded on the knowledge of the normal functions of the body. It has been pointed out that this knowledge has been gained and must continue to be gained largely from experiments on living animals. Vivisection is therefore an indispensable aid to the practice of medicine and the progress of medical science and an indispensable agent in the preservation of the public health.

Cruelty is the intentional infliction of unnecessary pain. By far the greater number of vivisections cause no real suffering, because the animals employed are made insensible to pain. The occasional vivisections in which *narcotics* are not used because they temporarily suspend the functions to be studied are not cruel. The pain they inflict is necessary to the better knowledge of the functions of the body and necessary therefore to the better preservation of the lives of men and of domestic animals. Countless multitudes of animals are slaughtered daily, without narcotics, to furnish food. This is not thought cruel. Other animals are mercilessly hunted down because their furs keep off the cold. Even this is not thought cruel. Yet the professional scientist, highly educated, carefully trained, laboring with small material reward for the advancement of learning and the public good, is held up to public condemnation, because, in the pursuit of those truths which underlie the successful fight against disease, he finds it necessary to study the functions of unconscious animals and very, very rarely to perform operations in which suffering cannot wholly be avoided.

The statutes of the Commonwealth prescribe the penalties to be inflicted on those found guilty of cruelty to animals, and on those who seek to disturb their fellow-citizens in the pursuit of their lawful occupations. The physiologist and the pathologist take their stand within the common law, ready at any time to submit to the impartial verdict of competent judges the method by which they endeavor to teach and to advance the science and the art of medicine.

Boston, July 12, 1895.

The foregoing article is reprinted in full that readers of the paper which precedes it may verify its quotations.

EXTRACT FROM THE ANNUAL ADDRESS

READ JUNE 7, 1871, BEFORE

THE MASSACHUSETTS MEDICAL SOCIETY,

BY

HENRY J. BIGELOW, M. D.,

PROFESSOR OF SURGERY IN HARVARD UNIVERSITY.

"How few facts of immediate considerable value to our race have of late years been extorted from the dreadful sufferings of dumb animals, the cold-blooded cruelties now more and more practiced under the authority of science!

The horrors of Vivisection have supplanted the solemnity, the thrilling fascination, of the old unetherized operation upon the human sufferer. Their recorded phenomena, stored away by the physiological inquisitor on dusty shelves, are mostly of as little present value to man as the knowledge of a new comet, . . . contemptible, compared with the price paid for it in agony and torture.

For every inch cut by one of these experimenters in the quivering tissues of the helpless dog or rabbit or Guinea-pig, let him insert a lancet one-eighth of an inch into his own skin, and for every inch more he cuts let him advance the lancet another eighth of an inch, and whenever he seizes, with ragged forceps, a nerve or spinal marrow, the seat of all that is concentrated and exquisite in agony, or literally tears out nerves by their roots, let him cut only one-eighth of an inch further, and he may have some faint suggestion of the atrocity he is perpetrating when the Guinea-pig shrieks, the poor dog yells, the noble horse groans and strains—the heartless vivisector perhaps resenting the struggle which annoys him. . . .

If a skillfully constructed hypothesis could be elaborated up to the point of experimental test by the most accomplished and successful philosopher, and if then a single experiment, though cruel, would forever settle it, we might reluctantly admit that it was justified. But the instincts of our common humanity indignantly remonstrate against the testing of clumsy or unimportant hypotheses by prodigal experimentation, or making the torture of animals an exhibition to enlarge a Medical School, or for the entertainment of students, not one in fifty of whom can turn it to any profitable account. The limit of such physiological experiment, in its utmost latitude, should be to establish truth in the hands of a skillful experimenter, with the greatest economy of suffering, and not to demonstrate it to ignorant classes and encourage them to repeat it.

The reaction which follows every excess will in time bear indignantly upon this. Until then it is dreadful to think how many poor animals will be subjected to excruciating agony as one Medical College after another becomes penetrated with the idea that vivisection is a part of modern teaching, and that, to hold way with other institutions, they, too, must have their vivisector, their mutilated dogs, their Guinea-pigs, their rabbits, their chamber of torture and of horrors, to advertise as a laboratory."

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