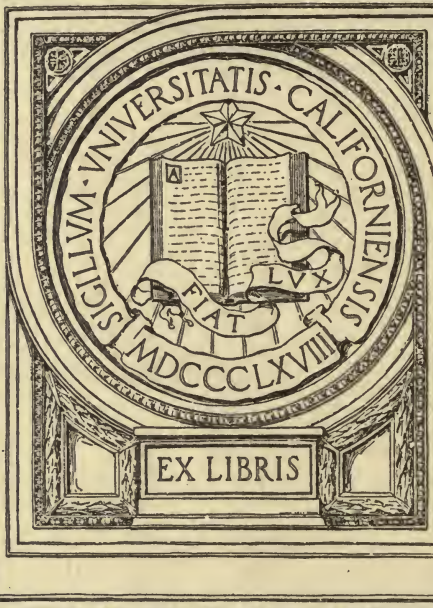
AN ETHICAL PROBLEM

ALBERT LEFFINGWELL



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AN ETHICAL PROBLEM

By the Same Author

RAMBLES IN JAPAN WITHOUT A GUIDE. London, 1892

ILLEGITIMACY, and

THE INFLUENCE OF SEASONS UPON CONDUCT. London and New York, 1893

VIVISECTION IN AMERICA. New York, 1895

THE VIVISECTION QUESTION. New York, 1901

THE MORALITY OF LONDON. London, 1908

THE VIVISECTION CONTROVERSY. London, 1908

AMERICAN MEAT. London and New York, 1910

AN ETHICAL PROBLEM

OR

SIDELIGHTS UPON SCIENTIFIC EXPERIMENTATION ON MAN AND ANIMALS

BY

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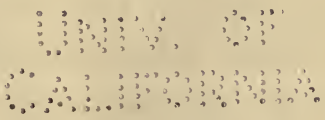

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PREFACE

The position taken by the writer of this volume should be clearly understood. It is not the view known as antivivisection, so far as this means the condemnation without exception, of all phases of biological investigation. There are methods of research which involve no animal suffering, and which are of scientific utility. Within certain careful limitations, these would seem to be justifiable. For nearly forty years, the writer has occupied the position which half a century ago was generally held by a majority of the medical profession in England, and possibly in America, a position maintained in recent years by such men as Sir Benjamin Ward Richardson of England, by Professor William James and Dr. Henry J. Bigelow of Harvard University. With the present ideals of the modern physiological laboratory, so far as they favour the practice of vivisection in secrecy and without legal regulation, the writer has no sympathy whatever.

An ethical problem exists. It concerns not the prevention of all experimentation upon animals, but

rather the abolition of its cruelty, its secrecy, its abuse.

Written at various times during a period extending over several years, a critic will undoubtedly discover instances of repetition and re-statement. Now and then, it has seemed advisable to include matter from earlier writings, long out of print; and new light has been thrown upon some phases of a perplexing problem. Will it tend to induce conviction of the need for reform ? Assuredly, this is not to be expected where there is disagreement regarding certain basic principles. First of all, there must be some common ground. No agreement regarding vivisection can be anticipated or desired with any man who holds that some vague and uncertain addition to the sum total of knowledge would justify experiments made upon dying children in a hospital, without regard to their personal benefit, or sanction the infliction of any degree of agony upon animals in a laboratory.

A liking for the use of italics as a means of directing attention to certain statements, is confessed. But wherever such italicized phrases appear in quotations, the reader should ascribe the emphasis to the writer, and not to the original authority.

The inculcation of scepticism regarding much that is put forth in justification of unlimited research is admitted. It seems to the writer that anyone who has become interested in the question would more

wisely approach it with a tendency toward doubt than toward implicit belief; to doubt, however, that leads one directly to investigation. We need to remember, however, that inaccuracy by no means connotes inveracity. There is here no imputation against the honesty of any writer, even when carelessness, exaggeration and inaccuracy are not only alleged, but demonstrated to exist.

A. L.

AURORA, N.Y.,
1914.

POSTSCRIPT

As these pages go to press, a vast portion of the civilized world is engaged in a conflict, the immensity and the horror of which have no parallel in history.

The outcome of the great struggle no one at this moment can foresee. Is it possible that Force, governed by ambition, is henceforth to hold in its grasp the destiny of nations? We cannot believe it. Rather let us trust that out of all this welter of agony and bloodshed much that makes for a higher civilization will eventually emerge; that the stipulated neutrality of peaceful nations will henceforth be more sacred; that the insolence which deems the promise of a nation to be no better than "a scrap of paper" shall meet its due recompense; that Attila and his hordes will hesitate hereafter to add to violated treaties the slaughter

of the innocent and the example of another Louvain; that the ambition that can plunge a world in war shall be crushed; and that the greatest of all Ethical Problems—the adoption of humaneness as a guiding principle of human conduct—shall find a widening recognition among the ideals of mankind.

A. L.

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INTRODUCTION

It is now somewhat over a third of a century since my attention was specially directed to the abuses of animal experimentation. In January, 1880, a paragraph appeared in a morning paper of New York referring to the late Henry Bergh. With his approval a Bill had come before the legislature of the State of New York providing for the abolition of all experiments upon living animals—whether in medical colleges or elsewhere—on the ground that they were without benefit to anybody, and demoralizing alike to the teacher and student. As I dropped the paper, it occurred to me that the chances of success would have been far greater if less had been asked. That certain vivisections were atrocious was undoubtedly true; but, on the other hand, there were some experiments that were absolutely painless. Would it not be wiser to make some distinctions ?

The attempt was made. An article on the subject was at once begun, and in July of the same year it was published in *Scribner's Magazine*, the predecessor of the *Century*. So far as known, it was the first argument that ever found expression in the pages of any American periodical favouring not the entire abolition of vivisection, but the reform of its abuse.

My knowledge of vivisection had its beginning in

personal experience. Nearly forty years ago, while teaching the elements of physiology at the Polytechnic Institute of Brooklyn, it occurred to me to illustrate the statements of textbooks by a repetition of such simple experiments as had come before my own eyes. Most of my demonstrations were illustrative of commonplace physiological phenomena: chloroform was freely used to secure unconsciousness of the animal, and with the exception of one or two demonstrations, the avoidance of pain or distress was almost certainly accomplished.

But what especially impressed me at the time was the extraordinary interest which these experiments seemed to excite. Students from advanced classes in the institute were often spectators and voluntary assistants. Of the utility of such demonstrations as a means of fixing facts in memory, I could not have the slightest doubt. Nor as regards the rightfulness of vivisection as a method either of study or demonstration, was there at that period any question in my mind. Whatever Science desired, it seemed to me only proper that Science should have. The fact that certain demonstrations or experiments upon living animals had already been condemned as unjustifiable cruelty by the leading men in the medical profession, and by some of the principal medical journals of England, was then as utterly unknown to me as the same facts are to-day unknown to the average graduate of every medical school in the United States. It was not until long after this early experience, and following acquaintance with the practice in Europe as well as at home, that doubts arose regarding the justice of *causing pain to illustrate facts already known*. These doubts became convictions, and were

stated in my first contribution to the literature of the subject, the paper in *Scribner's*. It is not the position of what is called "antivivisection," for that implies condemnation of every phase of animal experimentation. In the third of a century that has elapsed since this protest was made, the practice of vivisection has taken vast strides: it appears in new shapes and unanticipated environment. But the old abuses have not disappeared, and some of them, more urgently than ever before, demand the attention of thinking men and women.

Of personal contributions to the literature of the subject, during the past third of a century, nearly everything has been more or less polemical, called forth by either exaggeration of utility, inaccuracy of assertion, or misstatement of fact. Now it has been protest against the brilliant correspondent of a New York newspaper, who telegraphed from London an account of a visit to a well-known physiological laboratory, where he found animals all "fat, cheerful, and jolly," yet "quite unaffected by the removal of a spinal cord"—as sensible a statement as if he had referred to their jolly condition "after removal of their heads." Now it has been the manifesto of professors in a medical school declaring that in the institution to which they belonged no painful experiments had been performed—an assertion abundantly contradicted by their own publications. Now it is a Surgeon-General of the Army, defending one of the most cruel of vivisections in which he was not in any way concerned, by an exposition of ignorance regarding the elements of physiology; and, again, it has been a President of a medical association, making a speech, wherein hardly a sentence was not stamped with

inaccuracy and ignorance. To some natures controversy is exhilarating; to myself it is beyond expression distasteful. Yet, when confronted by false affirmations, what is one's duty? To say nothing? To permit the untruth to march triumphantly on its way? Or, in the interest of Science herself, should not one attempt the exposure of inaccuracy, and the demonstration of the truth?

Approaching the end of a long pilgrimage, it has seemed to me worth while to make a final survey of the great question of our time. How was the cruelty of vivisection once regarded by the leading members of the medical profession? Shall we say to-day that the utility of torment, in the vivisection of animals, constitutes a perfect justification and defence? How far did Civilization once go in the approval of torture because of its imagined deterrent effects?

What has been accomplished by the agitation concerning vivisection which has persisted for the last forty years? Has the battlefield been well selected? Have demands of reformers been wisely formulated? Is public opinion to-day inclined to be any more favourable to the legal abolition of all scientific experimentation upon animals than it was a third of a century ago?

What has been the result of vivisection in America, unrestricted and unrestrained? Has it accomplished anything for the human race that might not have been accomplished under conditions whereby cruelty should be impossible except as a crime? Has the death-rate been reduced by new discoveries made in American laboratories? Is it possible that utility is persistently exaggerated by those who are not unwilling to use ex-

aggeration as a means of defence ? And of the Future, what are the probabilities for which we may hope ? What is being done in our century in way of submitting animals to unlimited torture ?

To throw somewhat of light on these questions is the object of this volume. I wish it had been in my power to write a more extended and complete exposition of the problem, but limitations of strength, due to advancing age, have made that hope impracticable. But as one man drops the torch, another hand will grasp it ; and where now is darkness and secrecy, there will one day be knowledge and light.

AN ETHICAL PROBLEM

CHAPTER I

WHAT IS VIVISECTION?

Upon no ethical problem of our generation is the public sentiment of to-day more uncertain and confused than in its attitude toward vivisection. Why this uncertainty exists it is not very difficult to discern. In the first place, no definition of the word itself has been suggested and adopted sufficiently concise and yet so comprehensive as to include every phase of animal experimentation. It is a secret practice. Formerly more or less public, it is now carried on in closed laboratories, with every possible precaution against the disclosure of anything liable to criticism. Quite apart from any questions of usefulness, it is a pursuit involving problems of the utmost fascination for the investigating mind—questions pertaining to Life and Death—the deepest mysteries which can engage the intellect of mankind. We find it made especially attractive to young men at that period of life when their encouraged and cultivated enthusiasm for experimentation is not liable to be adequately controlled by any deep consideration for the " material " upon which they work. Sometimes animal experimentation is painless, and sometimes it involves suffering which may vary in degree from

distress which is slight to torments which a great surgeon has compared to burning alive, "the utmost degree of prolonged and excruciating agony." By some, its utility to humanity is constantly asserted, and by others as earnestly and emphatically and categorically denied. Confronted by contradictory assertions of antagonists and defenders, how is the average man to make up his mind? Both opinions, he reasons, cannot possibly be true, and he generally ranges himself under the banner of the Laboratory or of its enemies, according to his degree of confidence in their assertions, or his preference for the ideals which they represent.

Now, the object of all controversy should be to enable us to see facts as they are—to get at the truth. That difference of opinions will exist may be inevitable; for opinions largely depend upon our ideals, and these of no two individuals are precisely the same. But so far as facts are concerned, we should be able to make some approach to agreement, and especially as regards the ethical supremacy of certain ideals.

But first of all we need to define Vivisection. What is it?

Originally implying merely the cutting of a living animal in way of experiment, it has come by general consent to include all scientific investigations upon animals whatsoever, even when such researches or demonstrations involve no cutting operation of any kind. It has been authoritatively defined as "experiments upon animals calculated to cause pain." But this would seem to exclude all experimentation of a kind which is not calculated to cause pain; experiments regarding which all the "calculation" is to avoid pain;

as, for example, an experiment made to determine the exact quantity of chloroform necessary to produce death without return of consciousness. The British Royal Commission of 1875 defined it as "the practice of subjecting live animals to experiments for scientific purposes," avoiding any reference to the infliction of pain; yet, so far as pertains to the justification of vivisection, the whole controversy may turn on that. Any complete definition should at least contain reference to those investigations to which little or no objection would be raised, were they not part of the "system." It should not omit reference, also, to those refinements of pain-infliction for inadequate purposes—also a part of a "system," and which, to very distinguished leaders in the medical profession, have seemed to be inexcusable and wrong.

Suppose, then, we attempt a definition that shall be inclusive of all phases of the practice.

"Vivisection is the exploitation of living animals for experiments concerning the phenomena of life. Such experiments are made, *first*, for the demonstration, before students, of facts already known and established; or, *second*, as a method of investigation of some theory or problem, which may be with or without relation to the treatment of human ailments. Such experiments may range from procedures which are practically painless, to those involving distress, exhaustion, starvation, baking, burning, suffocation, poisoning, inoculation with disease, every kind of mutilation, and long-protracted agony and death."

A definition of this kind will cover 99 per cent. of all experiments. The extreme pro-vivisectionist may pro-

test that the definition brings into prominence the more painful operations; yet for the majority of us the only ground for challenging the practice at all is the pain, amounting to torment in some cases, which vivisection may involve. They are rare, some one says. But how do we know? The doors of the laboratory are closed. Of practices secretly carried on, what can we know? That every form of imaginable torment has at some time been practised in the name of Science, we may learn from the reports of experimenters themselves, and from the writings of men who have denounced them. It was Dr. Henry J. Bigelow, of Harvard University, the most eminent surgeon of his day, who declared that vivisection sometimes meant the infliction of "the severest conceivable pain, of indefinite duration," and that it was "a torture of helpless animals, more terrible, by reason of its refinement, than burning at the stake." Is the above definition of vivisection stronger than is implied by this assertion of Dr. Bigelow?

We need constantly to remember that vivisection is by no means a simple act. It may indicate investigations that require no cutting operation of any kind, and the infliction of no pain; or, on the other hand, it may denote operations that involve complicated and severe mutilations, and torments as prolonged and exquisite as human imagination can conceive. Experiments may be made, in course of researches, of very great interest and importance to medical science; and, on the contrary, they may be performed merely to demonstrate phenomena about which there is no doubt, or to impress on the memory of a student some well-known fact. They

may be performed by men like Sir Charles Bell, who hesitated to confirm one of the greatest of physiological discoveries of the last century, merely because it would imply a repetition of painful experiments; and they may be done by men like Magendie, who declared of his mutilated and tormented victims, that it was "*droll* to see them skip and jump about." It is because of all these differences that the majority of men have an indefinite conception of what they approve or condemn. The advocate of unrestricted vivisection sometimes tells us that experimentation implies no more pain than the prick of a pin, and that its results are of great utility to the human race; the antivivisectionist, on the other hand, may insist that such experimentation means inconceivable torment without the slightest conceivable benefit to mankind. Both are right in the occasional significance of the word. Both are wrong if one meaning is to answer for all varieties of experimentation upon living things.

Some years ago the attempt was made to obtain the view of animal experimentation held by certain classes of intelligent men and women. One view of the practice is that which regards it merely as a method of scientific research, with which morality has no more to do than it would have in determining in what direction a telescope should be pointed by an astronomer, or what rocks a geologist should not venture to touch. A statement embodying the views of those who favour unrestricted vivisection included affirmations like these:

"Vivisection, or experimentation upon living creatures, must be looked at simply as a method of studying the phenomena of life. With it, morality has nothing to do. It should be subject

neither to criticism, supervision, nor restrictions of any kind. It may be used to any extent desired by any experimenter—no matter what degree of extreme or prolonged pain it may involve —for demonstration before students of the statements contained in their textbooks, as an aid to memory, . . . or for any conceivable purpose of investigation into vital phenomena. . . . While we claim many discoveries of value, . . . yet even these we regard as of secondary importance to the freedom of unlimited research."

This is the meaning of free and unrestricted vivisection. Its plainness of speech did not deter very distinguished physiologists and others from signing it as the expression of their views. One can hardly doubt that it represents the view of the physiological laboratory at the present day. Sixty years ago this view of vivisection would have found but few adherents in England or America; to-day it is probably the tacit opinion of a majority of the medical profession in either land. One may question whether any similar change of sentiment in a direction contrary to reform has ever appeared since Civilization began. We shall endeavour to show, hereafter, to what that change is due.

Absolutely opposed to this sentiment are the principles of what is known as " antivivisection." According to this view, all vivisection is an immoral infringement upon the rights of animals. The cruelties that accompany research will always accompany it, until all scientific experimentation upon animals is made a criminal offence. From a statement of opinion giving expression to this view, the following sentences are taken:

" All experimentation upon living animals we consider unnecessary, unjustifiable, and morally wrong. . . . Even if utility could be proved, man has no right to attempt to benefit

himself at the cost of injury, pain, or disease to the lower animals. The injury which the practice of vivisection causes to the moral sense of the individual and to humanity far outweighs any possible benefit that could be derived from it. Dr. Henry J. Bigelow, Professor in the Medical School of Harvard University, declared that 'vivisection deadens the humanity of the students.' Nothing which thus lowers morality can be a necessity to progress. . . . Painless or painful, useless or useful, however severe or however slight, vivisection is a practice so linked with cruelty and so pernicious in tendency, *that any reform is impossible,* and it should be absolutely prohibited by law for any purpose."

This is antivivisection. It is a view of the practice which has seemed reasonable to large numbers of earnest men and women whose lives in various directions have been devoted to the prevention of all kinds of cruelty, and to the promotion of the best interests of the race. When this view is maintained by men and women who oppose the killing of animals for purposes of food or raiment or adornment, or their exploitation in any way which demands extinction of life, it is entirely consistent with high ideals. It is against this view that the arguments of those who contend for vivisection, without restriction or restraint, are always directed.

But even among antivivisectionists there are, naturally, differences of opinion. For instance, the *National Antivivisection Society,* the principal organization of England, desires to see vivisection totally abolished by law; but, meanwhile, it will strive for and accept any measures that have for their object the amelioration of the condition of vivisected animals. On the other hand, the *British Union for the Total Abolition of Vivisection* will accept nothing less than the legal condemnation of every phase of such experiments. "Vivisection," the secretary of this society writes, "is a system, and not

a number of isolated acts to be considered separately. Owing to its intricate and interdependent character and the international competition involved, *use cannot be separated from abuse.*" In other words, every conceivable phase of scientific experimentation upon living creatures, even if absolutely painless, should be made a legal offence.

But we are not driven to accept one or the other of these definitions of animal experimentation. A third view of vivisection exists, which differs widely from either of these opposing ideals. Instead of taking the position of the anti-vivisectionist that *all* scientific investigations involving the use of animals, should be legally prohibited, it maintains that distinctions may, and should, be drawn, and that only the abuses of vivisection should be condemned by law. It asks society neither to approve of everything, nor to condemn everything, but to draw the line between experiments that, by reason of utility and painlessness, are entirely permissible, and others which ought assuredly to be condemned. It makes no protest against experimentation involving the death of an animal where it is certain that consciousness of pain has been abolished by anæsthetics; but it condemns absolutely the exhibition of agony as an easy method of teaching well-known facts. The utility of certain experiments it does not question; but even increase of knowledge may sometimes be purchased at too high a price. From a statement of this position regarding vivisection, drawn some years since, the following sentences may be of interest:

"Vivisection is a practice of such variety and complexity, that, like warfare between nations, one can neither condemn it nor

approve it, unless some careful distinctions be first laid down. . . . Within certain limitations, we regard vivisection to be so justified by utility as to be legitimate, expedient, and right. Beyond these boundaries, it is cruel, monstrous, and wrong. . . . We believe, therefore, that the common interests of humanity and science demand that vivisection, like the study of human anatomy in the dissecting-room, should be brought under the direct supervision and control of the State. The practice, whether in public or in private, should be restricted by law to certain definite objects, and surrounded by every possible safeguard against license or abuse."

This is a statement of what is meant by vivisection-reform. Every unprejudiced mind can see at once that it is not the same as antivivisection. Is it the enemy of science? The leading name affixed to this declaration of principles was that of the late Herbert Spencer, the chief apostle of modern science. Is it against the interests of education? It was signed by eleven presidents of American universities and colleges, and by a large number of men closely connected with institutions of learning. Is it antagonistic to medical science and art? The statement received the endorsement of twice as many physicians and surgeons as were favourable to experimentation upon animals without any restriction or restraint; and among these physicians favourable to reform were men of national reputation. No one should expect that men whose sole profession is experimentation of this character would approve of any limitations to their activity in any direction; but they constitute only a small fraction of human society. Outside their ranks we may be confident that there are very few, at all acquainted with the subject, who will not concede that in the past many things have been done in this exploitation of animal life which are greatly to be

deplored. Is there, then, no method of prevention? Are we simply to fold our hands and trust that the humaner instincts of the present-day vivisector, working in the seclusion of his private laboratory, will keep him free from all that we regret in the vivisection of the past? Or must we, on the other hand, ask for the total condemnation of every experiment, because some are cruel and atrocious?

This is the platform of the Restrictionist. It cannot —except by perversion of truth—be regarded as anti-vivisection, for there is not a single society in England or America, devoted to the interests of that cause, which would acknowledge these views as in any way representative of its ideals; but it is the expression of sentiments which formerly were almost universally held by the medical profession of England. Yet the advocates of unrestricted vivisection have never been willing to consider this position, and, in controversy, invariably fall back upon arguments applicable only to the views of those who would abolish vivisection altogether.

There is yet another position to be taken; it is the attitude of unconcern. From vast numbers nothing better can be expected. The man who is utterly indifferent to the unnecessary agony accompanying the slaughter of animals for food, or to the cruelties of sport, or the woman whose vanity demands sacrifices of animals at the cost of incalculable suffering, will take little or no interest in the question of vivisection; nor is complicity with other phases of torment and cruelty alone responsible for the indifference which so generally exists. In every age, from the twilight of earliest savagery down to the present time, the vast majority

of human beings have been inclined, not to doubt, but to believe, and especially to believe those who claimed superior knowledge in matters of Life and Death. This tendency to unquestioning faith has been the support of every phase of injustice, of cruelty, and of wrong. It has led innumerable men and women of education and refinement to remit all questions of animal experimentation to the vivisector and his friends, precisely as they would have done had they lived three centuries ago, and had it been theirs to decide on the morality of burning a witch. On the other hand, the alliance between the laboratory and the medical profession, their mutual endeavour to stifle criticism and to induce approval of all vivisection whatever, has given rise to a new spirit of inquiry. A moral question is never absolutely decided until it is decided aright. If the problem of vivisection is ever settled, it will be due, not to the influence of those who advocate unquestioning faith in the humaneness of the average experimenter, who decline inquiry, and who rest satisfied with their ignorance, but rather to those who, having investigated the question for themselves, have given all their influence for some measure of reform. In questions of humanity, even the unwisdom of enthusiasm that tends towards reform is far better than indifference and unconcern.

The ignorance of history, shown often by the advocates of unlimited vivisection, is a singular phenomenon. The beginnings of this controversy are not without interest. Let us glance at them.

CHAPTER II

ON CERTAIN MISTAKES OF SCIENTISTS

EVERY reflecting student of history is struck by the divergence of opinions manifest among educated men in regard to the great problems of life. Why is it that so few of us are able to state the facts and arguments which favour conclusions to which we are utterly opposed? Take, for instance, the great question of religious belief. Can one refer to any Protestant writer of our time who has placed before his readers the arguments which inclined men like Newman or Manning to the Catholic faith? Has any Catholic writer of our time been able to present fairly the arguments which seem so overwhelmingly convincing to Protestant thinkers? In either case, is there not something of distortion or exaggeration? Certainly it cannot be due to intentional and perverse obliquity of mental vision. As a rule reasonable men endeavour to be just and fair. Now and then, in the heat of controversy, a tendency to overstatement or exaggeration may be evident, especially where great issues appear to be involved; but the purpose can be reconciled with honesty. Is it not more than probable that the principal reason for divergent views on the part of honest opponents is *ignorance of facts?*

Take, for example, the opinion held to-day by the great majority of young physicians concerning

animal experimentation. As a rule they regard all criticism of vivisection with infinite contempt. During their medical studies they were continually imbued with the idea that the opposition to laboratory freedom of experimentation was an agitation of comparatively recent date, and confined to a small class of unthinking sentimentalists. Of that strong protest against cruel experiments which made itself heard during more than a century, and of the atrocities which led to that protest, the average physician of to-day knows nothing whatever. Plunged into the practice of a profession which may absorb every moment of time, he has perhaps neither leisure to investigate nor disposition to doubt whatever he has been told.

Now, if the average student of medicine is thus ignorant of history, is it not because those who have taught him were equally devoid of knowledge of the facts? Of the history of the vivisection controversy previous to 1875, some of the most distinguished men in the medical profession have proved themselves profoundly ignorant. Illustrations of this lack of information might be almost indefinitely adduced, but I propose to bring forward only a few instances typical of their kind.

On June 10, 1896, Dr. Henry P. Bowditch, then professor of physiology in Harvard Medical School, delivered an address on vivisection before the Massachusetts Medical Society. The character of his audience, and the profession of the speaker, might be presumed to give assurance of absolute accuracy concerning any question of historic fact. A quarter of a century before, Dr. Bowditch had studied physiology in German labora-

tories. Returning to America in 1871, he had been given the opportunity of reorganizing the teaching of physiology at Harvard Medical School, so as to bring it into conformity with Continental methods. It is quite probable that to him, more than to any other person, is due the introduction of Continental methods of physiological instruction in the medical colleges of the United States.

According to Dr. Bowditch, the criticism of vivisection in England began in 1864. To his audience of physicians he made the following statement:

> "The first serious attack upon biological research in England seems to have been made in an essay entitled 'Vivisection: is it Necessary or Justifiable?' published in London in 1864, by George Fleming, a British veterinary surgeon. This essay is an important one, for though characterized at the time by a reviewer in the London *Athenæum* as 'ignorant, fallacious, and altogether unworthy of acceptance,' its blood-curdling stories, applied to all sorts of institutions, have formed a large part of the stock-in-trade of subsequent vivisection writers."

This sneering reference to "blood-curdling stories" is of itself extremely significant. It indicates unmistakably the utter contempt which nearly every physiologist feels for the sentiment of humaneness which underlies protest against experimental cruelty. The speaker omitted to tell his audience that this essay of Dr. Fleming received the first prize offered by the "Royal Society for the Prevention of Cruelty to Animals," and that the Committee which decided the merits of the essay included some of the most eminent scientific men of England, among them Sir Richard Owen and Professor Carpenter—the latter one of the most distinguished of English physiologists of his time. He

forgot to add that if the examples of atrocious vivisection given in this essay were horrible—as they were—yet every instance was substantiated by reference to the original authorities, and that their accurate quotation could not be impugned. Especially curious is the fact that Professor Bowditch placed the beginning of criticism at 1864. Of the arraignment of cruel vivisections by English physicians and English medical journals before that time, Dr. Bowditch apparently never heard, and all the infamous atrocities which they condemned he dismissed with a sneer as " blood-curdling stories." Yet, in his day, the speaker was one of the leading physiologists of the United States. We cannot believe that the suppression of material facts was intentional; it was due rather to complete ignorance of the history of that protest against physiological cruelty which England witnessed during the first part of the nineteenth century, and of which some account shall follow.

Take another instance. In the *International Journal of Ethics* for April, 1904, there appeared an article in defence of animal experimentation by Professor Charles S. Myers of the University of Cambridge, England. Of any abuses of the practice, Dr. Myers gave his readers no reason for believing that he had ever heard; and as an indication, perhaps, of an animal's eagerness to be vivisected, he tells us that " again and again dogs have been observed to wag the tail and lick the hands of the operator even immediately before the beginning of the operation." Commenting upon the singular conclusion which this fact seemed to suggest to Dr. Myers, the present writer quoted a sentence or two from an editorial

which once appeared in the columns of the London *Lancet*.[1] It would apparently seem that Dr. Myers brought the quotation to the attention of someone in the editorial office of the *Lancet*, on whose judgment he thought he might safely rely; for, in a reply, he refers to it as a quotation "attributed to the editor of the *Lancet*, which, *after special inquiry, I have reason for doubting*." Concerning a reference to some of Dr. Sydney Ringer's experiments upon patients in a London hospital, he is even more confident that they could never have occurred, and indignantly rejoins, "I unhesitatingly declare *such abominable accusations to be false*."

Now, all this indignant scepticism was rather creditable to the writer's heart. That an English medical journal like the *Lancet* should denounce vivisection cruelties, or that a reputable London physician should experiment on his patients with various poisons, seemed to Dr. Myers beyond the bounds of belief. But it is always a serious thing positively to deny any historical reference simply because of personal ignorance of its truth. It was quite easy to refer the sceptic not only to the editorial which he thought he "*had reason for doubting*," but also to the experiments on human beings concerning which his indignation rose so high. To be ignorant of Dr. Ringer's experiments on his patients is to be ignorant of the history of modern medicine. The *Medical Times* (London) in its issue of November 10, 1883, thus editorially commented upon certain of these experiments:

[1] See p. 73 for this *Lancet* editorial.

". . . In publishing, and, indeed, in instituting their reckless experiments on the effect of nitrite of sodium on the human subject, Professor Ringer and Dr. Murrill have made a deplorably false move. . . . It is impossible to read the paper in last week's *Lancet* without distress. Of the *eighteen* adults to whom Drs. Ringer and Murrill administered the drug in 10-grain doses, all but one averred that they would expect to drop down dead if they ever took another dose. . . . Whatever credit may be given to Drs. Ringer and Murrill for scientific enthusiasm, it is impossible to acquit them of grave indiscretion. There will be a howl throughout the country *if it comes out that the officers of a public charity are in the habit of trying such useless and cruel experiments on the patients committed to their care.*" [1]

What but ignorance of the history of medicine during the last fifty years could lead any one to deny the occurrence of experiments, the proofs of which rest on statements in medical journals, and in the published works of the experimenters themselves ?

One of the most singular statements concerning vivisection that ever appeared in print was given out not many years ago by one of the professors of physiology in Harvard Medical School.[2] The accuracy of this manifesto—which purported to be " a plain statement of the whole truth "—received the endorsement of five of the leading teachers of science in the same institution, men whose scientific reputation would naturally give great weight to their affirmations regarding any question of fact. So impressed was the editor of the *Boston Transcript* with the apparent weight of this testimony, that he declared in its columns that " the character and standing of the men whose names are given as respon-

[1] In all quotations, here and elsewhere throughout this volume, the italics have been supplied.

[2] See "The Vivisection Question," pp. 114-133 and 253.

sible for this explanation to the Boston public, *forbid any questioning of its statement of facts.*" What is the value of authority in matters of science, if assertions so fortified by illustrious names are to be received with doubt?

The inaccuracy which characterized this "statement of the whole truth" was demonstrated at the time it appeared; but to one paragraph attention may be recalled. The manifesto touches the question of past cruelties in animal experimentation, not merely without the slightest criticism or condemnation, but, on the contrary, with what would seem to be a definite denial that anything reprehensible had ever occurred. It contemptuously referred to evidence of abuses, as "these reiterated charges of cruelty, *these long lists of atrocities that never existed.*" What other meaning could the average reader obtain than the suggestion that the cruelties of Spallanzani, of Magendie, of Mantegazza, of Brown-Séquard, of Brachet, and a host of others, existed only in the imagination, *and had no basis of fact?* For this astounding suggestion, what explanation is possible? That there was a deliberate purpose to mislead the public by an affirmation that cruel and unjustifiable experiments were a myth, the creation of imagination, is an hypothesis we must reject. But there must have been a stupendous ignorance concerning the past history of animal experimentation. Simply because of their utter lack of knowledge regarding history, distinguished scientists became responsible for suggesting to the public that the story of the past cruelty of vivisection was a myth, and unworthy of belief.

While illustrations of this singular ignorance of the past might be almost indefinitely multiplied, another example must for the present suffice. It is afforded by the evidence given before the Royal Commission of Vivisection in 1906, by Sir William Osler, M.D., Fellow of the Royal Society, and Regius Professor of Medicine at the University of Oxford. In course of his examination, the following dialogue occurred:[1]

"Are you familiar with the writings of Dr. Leffingwell?"

"Yes."

"I think he points out that it was through the strong attacks that appeared in the *Lancet* and the *British Medical Journal* that the Vivisection Act was passed?"

"*That is news to me.*"

"You do not know that?"

"*No.*"

Perhaps the question asked may have implied somewhat more of influence on the part of the medical journals named than actually belonged to them; but these periodicals certainly initiated that exposure and condemnation of cruelty in vivisection—which in England led to an agitation for reform. Sir William Osler's replies, however, suggest something more than mere word-fencing; he was evidently surprised to hear it intimated that medical journals like these could ever have been found attacking vivisection in any way. Of the strong attacks which appeared in these organs of medical opinion less than forty years before, he had apparently never heard. Now, when men like these, leaders in the formation of public opinion on medical matters, are thus ignorant of history, ought one really to wonder at the lack of knowledge on the same subject

[1] Minutes of Evidence, Questions 16,780-16,782.

betrayed by the new generation of physicians in active practice to-day—men not only of lesser influence, but of more restricted opportunities for gaining information? Ninety-nine out of every hundred of the physicians engaged in medical instruction in England and America probably would have replied to the questions asked Sir William Osler to the same effect—"It is news to me." Sitting at their feet, how can pupils be expected to do otherwise than to absorb both their prejudices and their learning? How can any medical student distinguish between them? We are all inclined to give implicit faith to men whose abilities in any direction we admire and reverence. It is only with the advance of years and the test of experience that men come to learn the distrust of authority, the wisdom of doubt, and the value of personal inquiry concerning every great problem of life.

Suppose, then, that we look into this question. Was Professor Bowditch correct in assigning the beginnings of criticism concerning vivisection to Dr. Fleming's essay published in 1864? Or was its origin long before? Were the professors of the Medical School accurate of statement when they practically denied that cruelty in vivisection was a historic fact, and endorsed a reference to authenticated instances as "long lists of atrocities *that never occurred*"? Is it a fact—although Dr. Myers of Cambridge and Sir William Osler of Oxford apparently never heard of it—that it was the *medical* journals of England whose indignant condemnation of vivisection cruelties led up to its attempted regulation by law? The public assumes that authorities like these are not likely to err concerning

methods of medical instruction or research. In the mind of the average man, every prepossession is in their favour; he cannot easily bring himself to believe that if cruelty ever existed, *they* should be so completely ignorant of it. It may, indeed, be questioned whether in the literature of controversy on the subject there has been a single defender of unrestricted freedom in vivisection, who has intelligently referred to the horrible experiments of past vivisectors except either to sneer or to condone. Even Mr. Stephen Paget, in his recent work, "Experiments upon Animals," never once condemned the cruelty that but a generation ago excited indignation throughout the medical profession of Great Britain.

The truth of this matter is not to be attained by unquestioning acceptance of authority, but by a study of the history of the past. It would be impossible, except in a volume, to write a complete history of that protest against the unjustifiable cruelties of animal experimentation, which gradually led to a demand for their legal suppression. All that may here be attempted is a demonstration that the sentiment is not of recent origin; that more than a century ago the cruelties, which to-day are so carefully ignored, were unquestioned as facts, and that to medical journals of England is principally due that weighty condemnation of cruel vivisection, which probably more than any other influence was the foundation of the agitation for vivisection reform.

CHAPTER III

AN EIGHTEENTH-CENTURY VIVISECTOR

ENGLISH literature during the eighteenth century presents no more distinguished name than that of Dr. Samuel Johnson, the lexicographer and essayist. His learning was immense; his judgments and criticisms were everywhere regarded with respect; and, above other great men of his time, he was fortunate in having as friend and companion one who produced the best biography that the world has ever known.

Dr. Johnson's views of vivisection and vivisectors appeared as a contribution to the *Idler*, on August 5, 1761, more than a hundred years before the date given by Professor Bowditch as that of "*the first serious attack upon biological research in England.*" It may, nevertheless, be doubted whether any attack more "serious" or protest more weighty was ever made than was written by the most eminent literary man of his time, a century and a half ago.

"Among the inferior professors of medical knowledge is a race of wretches whose lives are only varied by varieties of cruelty; whose favourite amusement is to nail dogs to tables and open them alive; to try how long life may be continued in various degrees of mutilation, or with the excision or laceration of vital parts; to examine whether burning irons are felt more acutely by the bone or tendon; and whether the more lasting

agonies are produced by poison forced into the mouth or injected into the veins. It is not without reluctance that I offend the sensibility of the tender mind with images like these. If such cruelties were not practised, it were to be desired that they should not be conceived; but since they are published every day with ostentation, let me be allowed once to mention them, since I mention them with abhorrence. . . . The anatomical novice tears out the living bowels of an animal, and styles himself a 'physician'; prepares himself by familiar cruelty for that profession which he is to exercise upon the tender and the helpless, upon feeble bodies and broken minds, and by which he has opportunities to extend his arts and tortures, and continue those experiments upon Infancy and Age which he has hitherto tried upon cats and dogs. What is alleged in defence of these hateful practices, everyone knows; but the truth is that by knives and fire knowledge is not always sought, and is very seldom attained. I know not that by living dissections any discovery has been made by which a single malady is more easily cured. And if the knowledge of physiology has been somewhat increased, he surely buys knowledge dear who learns the use of the lacteals at the expense of his own humanity. *It is time that a universal resentment against these horrid operations should arise,* which tend to harden the heart, and make the physician more dreadful than the gout or the stone."

A more vigorous denunciation of the cruelty of vivisection never appeared than these words of the first scholar of the English-speaking world. Of course the plea will be put forth that in Dr. Johnson's time the use of anæsthetics was unknown. Are we, then, to conclude that the present-day defenders of absolute freedom in animal research would join him in condemning the perpetrators of *all experiments causing distress in which anæsthetics cannot be employed?* For the merit of Dr. Johnson's plea lies in this, *that he makes ethical considerations of higher importance than the discovery of physiological facts.* "If the knowledge of physiology has been somewhat increased, he surely buys knowledge dear

who learns the use of the lacteals at the expense of his own humanity." Is there a physiological defender of vivisection-freedom living to-day who would accept Dr. Johnson's conclusion, that one should forbear research which is possible only by the infliction of animal torment? How unfair it is, therefore, to suggest that the force of Dr. Johnson's argument is invalidated because anæsthetics were unknown—when the disagreement is infinitely deeper!

To what physiologists of his time did Dr. Johnson allude? Apparently his denunciation was sweeping; he referred to "a race of wretches" rather than to any particular individual, and to experiments then carried on and "published every day with ostentation." Who were the men thus stigmatized? We do not know. The record of their useless tormenting has sunk into the oblivion that hides their names; there are but one or two whose identity may perhaps be guessed. It is possible that one of them was John Hunter; yet Hunter did not go up to London until 1764, and Dr. Johnson's condemnation had appeared three years earlier. Still, this does not preclude the possibility that Dr. Johnson had Hunter in his mind.

In some ways John Hunter was a remarkable man. He made an anatomical collection, which is still in existence and which bears his name. At Earl's Court, then a suburb of London, he established a sort of zoölogical Inferno, that reminds one of the "Island of Dr. Moreau." One of his biographers, Ottley, tells us that Hunter "*took supreme delight*" in his physiological experiments; and inasmuch as he suggested in a letter to a friend the performance of the most agonizing

experiments as likely to "amuse" him, the statement was undoubtedly true. A man's occupation generally has an influence upon his character, and Hunter's biographer rather hesitatingly admits that "he was not always very nice in his choice of associates," and that among his companions were certain abominable wretches known as "resurrection men," who robbed graveyards for the benefit of students of anatomy. Under all circumstances, we can hardly be surprised that his married life was anything but serene.

In the infliction of pain he seems to have been without any idea of pity. To a friend who asked for his experience in a certain matter, he wrote:

"I thank you for your experiment on the hedgehog; but *why do you ask me a question,* by the way of solving it? I think your solution is just, but why—*why not try the experiment?* Repeat all the experiments upon a hedgehog as soon as you receive this, and they will give you the solution. *Try the heat. Cut off a leg* . . . and let me know the result of the whole.

"Ever yours,

"JOHN HUNTER."

Even his own word, or the result of his own observations, he did not wish to have accepted, when, merely at the cost of another tortured animal, his friend could find the answer for himself. Is not this the physiological ideal of to-day?

Again he writes to his scientific friend:

"If you could make some experiments on the increased heat of inflammation, I should be obliged to you. . . . I opened the thorax of a dog between two ribs, and introduced the thermometer. Then I put some lint into the wound to keep it from healing by the first intention, *that the thorax might inflame;*

but before I had time to try it again, my dog died on the fourth day. A deep wound might be made into the thick of a dog's thigh, then put in the thermometer and some extraneous matter. . . . *If these experiments will amuse you,* I should be glad they were made; but take care you do not break your thermometer in the dog's chest."

"*If these experiments will amuse you*"—what a suggestive confirmation of Dr. Johnson's charge that the torture of vivisection was then regarded as an "amusement"! A century after, an Italian physiologist, Mantegazza, devoted a year to the infliction of extreme torment upon animals, and confessed that his tortures were inflicted, not with hesitation or repugnance, but "*con multo amore*," with extreme delight.[2]

Hunter does not seem to have regarded his own experiments other than as an intellectual pastime. Mr. Stephen Paget, in his work on "Animal Experimentation," refers to "one great experiment . . . that puts him [Hunter] on a line with Harvey"—an experiment upon a deer in Richmond Park. There is no reason for doubting that such experiment may have been made; but the curious thing is, that it rests only on verbal tradition, for in his surgical lectures treating of aneurism Hunter has not a word to say of the experiment which now, we are told, "links his name with that of Harvey," who made known the circulation of the blood. His biographer, Ottley, referring to his surgical operation for aneurism, tell us that "he was led to propose the improved method, in consequence of the frequent failure of the operation by the old mode." No reference what-

[1] Barron's "Life of Jenner," i. 44.

[2] "Fisiolgia del Dolore di Paulo Mantegazza," pp. 101-107.

ever is made to the legendary experiment on the stag in Richmond Park.[1]

Of other experiments by Hunter we know more. Sometimes his observations were of a character that illustrates his environment. In his "Observations" Hunter tells us that at one time, on going to bed at night, he "observed bugs, marching down the curtains and head of the bed; of those killed, *none* had blood in them." In the morning "I have observed them marching back, and all such were found *full of blood!*"[2] A wonderful discovery for a philosopher to record, leaving unmentioned the one experiment and observation by which his fame is to be linked with that of Harvey!

Hunter had erroneous views on various matters of science. He believed there was "no such thing as a primary colour, every colour being a mixture of two, making a third." He tells us that he once formed a theory that if a human being were completely frozen, "life might be prolonged a thousand years; getting himself thawed every hundred years, he might learn what had happened during his frozen condition."[3] His biographer, Ottley, alludes to this theory of Hunter's as "a project which, if realized, he expected would make his fortune."[4] With this not altogether admirable object in view, his experiments upon freezing animals were doubtless made. A dormouse, confined in a cold mixture, he tells us, "showed signs of great uneasiness; sometimes it would curl itself into round form to preserve its extremities and confine the heat, and finding

[1] Ottley's "Life of Hunter," p. 97.
[2] Letter to Ottley, "Life," p. 89.
[3] "Lectures," i. 284.
[4] Ottley's "Life of Hunter," p. 57.

that ineffectual, would then endeavour to escape." Its feet were at last frozen, but Hunter could not freeze the entire animal because of the protection afforded by the hair. How should the scientist overcome this difficulty? He pondered over the problem; then made a dormouse completely wet all over, and placed it in the freezing-mixture. The wretched animal "made repeated attempts to escape," but without avail, and finally became quite stiff. Alas, for the grand "fortune"! Hunter tells us that "on being thawed, it was found quite dead!"[1]

The influence of Hunter upon English biology was undoubtedly very great. In a mean and sordid society, he was an enthusiast for the acquisition of knowledge, and while his passion for physiology induced—as it so often does—an indifference regarding the infliction of pain, his pitiless vivisections were not more cruel than experiments made in this twentieth century, and some of them by men of national reputation. He was the type of the class of experimenters whom Dr. Johnson had in his mind, men whose long practice in the infliction of torment creates an indifference to the ordinary emotions of humanity, so that even in the causation of agony they find something "to amuse," and in the performance of the most painful vivisection an occasion for "supreme delight."

[1] Hunter's Works, vol. iv., p. 133.

CHAPTER IV

MAGENDIE AND HIS CONTEMPORARIES

It may be doubted whether any physiologist has ever lived whose cruelty to animals exceeded that which, for a long period, was exercised by François Magendie. Born at Bordeaux, France, in 1783, just before the beginning of the French Revolution, he studied medicine, receiving his medical degree in the year 1808. Entering with some zest upon the study of physiology, he published several pamphlets regarding his investigations, and rapidly earned that notoriety—which for some natures is the equivalent of fame—for the peculiar and refined torments which, in public demonstrations, he took frequent occasion to inflict. In 1821 he was elected a member of the Institute; in 1831 he had become a professor in the College de France, a position he held for the remainder of his life. He died in 1855.

One of the earliest exposures of Magendie's infamous vivisections was made in the British Parliament. On February 24, 1825, Mr. Richard Martin of Galway, an Irish Member of the House of Commons, moved to bring in a Bill for the repression of bear-baiting and other forms of cruelty to animals. His name is worth remembering, for to this Richard Martin belongs the honour of being one of the first men in any land who attempted

to secure some repression of cruelty to animals through the condemnation of the law. During his speech on this occasion Mr. Martin said:

"It was not merely bear-baiting and sports of a similar character that he wished to abolish; there were other practices, equally cruel, with which he thought the legislature ought to interfere. There was a Frenchman by the name of Magendie, whom he considered a disgrace to Society. In the course of the last year this man, at one of his anatomical theatres, exhibited a series of experiments so atrocious as almost to shock belief. This M. Magendie got a lady's greyhound. First of all he nailed its front, and then its hind, paws with the bluntest spikes that he could find, giving as a reason that the poor beast, in its agony, might tear away from the spikes if they were at all sharp or cutting. He then doubled up its long ears, and nailed them down with similar spikes. (Cries of 'Shame!') He then made a gash down the middle of the face, and proceeded to dissect all the nerves on one side of it. . . . After he had finished these operations, this surgical butcher then turned to the spectators, and said: 'I have now finished my operations on one side of this dog's head, and I shall reserve the other side till to-morrow. If the servant takes care of him for the night, I am of the opinion that I shall be able to continue my operations upon him to-morrow with as much satisfaction to us all as I have done to-day; but if not, *although he may have lost the vivacity he has shown to-day*, I shall have the opportunity of cutting him up alive, and showing you the motion of the heart.' Mr. Martin added that he held in his hands the written declarations of Mr. Abernethy, of Sir Everard Home (and of other distinguished medical men), all uniting in condemnation of such excessive and protracted cruelty as had been practised by this Frenchman."[1]

Within the past forty years has the cruelty of Magendie been condemned by any English or American physiologist? I have never seen it.

The objection is sometimes raised that evidence like

[1] Hansard's Parliamentary Reports, February 24, 1825.

this of Magendie's cruelty is only "hearsay." Is not this generally the case where inhumanity is concerned? When Wilberforce described the atrocities of the African slave trade, or Shaftesbury the conditions pertaining to children in coal-mines and cotton mills, their statements were equally questioned; yet, when reform had been accomplished, nobody doubted that, although they had not personally witnessed the cruelties, they had reported only the facts. Now, one peculiarity of Magendie's vivisections *was their publicity*. There was no attempt at concealment, such as governs the practice in England and America to-day. Magendie's experiments were publicly made, seemingly with a desire to parade his contempt for any sentiment of compassion towards animals. The evidence of Magendie's cruelty is supported by an overwhelming amount of evidence, and to Mr. Martin's account of his vivisections, none of Magendie's English friends or apologists ever ventured to reply in the public journals of the day.

An English physician, Dr. John Anthony, a pupil of Sir Charles Bell and a strong advocate of vivisection, has given us a little account of his personal experience in 1838, while a student of medicine in Paris. The English members of his class, he says, "were indignant at the *cruelties* which we saw manifested *in the demonstration of experiments on living creatures*. . . . What I saw in Paris pointed to this: that very frequently men who are in the habit of making these experiments are very careless of what becomes of the animal when it has served its purpose; . . . the animal is thrown (aside) to creep into a corner and die. . . . I have carefully avoided seeing experiments in vivisection after the awful

dose which I had of it in Paris, in 1838. *The men there seemed to care no more for the pain of the creature being operated upon than if it were so much inorganic matter.*" [1]

Another witness of Magendie's cruelty was Dr. William Sharpey, LL.D., Fellow of the Royal Society, and for more than thirty years the professor of physiology in University College, London. It is a curious fact that the "Handbook of the Physiological Laboratory," which, when published in 1871, increased the agitation against vivisection, was dedicated to Professor Sharpey. Before the Royal Commission on Vivisection, in 1876, he gave the following account of his personal experience:

"When I was a very young man, studying in Paris, I went to the first of a series of lectures which Magendie gave upon experimental physiology; and I was so utterly repelled by what I witnessed that I never went again. In the first place, they were painful (in those days there were no anæsthetics), and sometimes they were severe; and then *they were without sufficient object.* For example, Magendie made incisions into the skin of rabbits and other creatures *to show that the skin is sensitive!* Surely all the world knows the skin is sensitive; no experiment is wanted to prove that. Several experiments he made were of a similar character, *and he put the animals to death, finally, in a very painful way.* . . . Some of his experiments excited a strong feeling of abhorrence, not in the public merely, but among physiologists. There was his—I was going to say 'famous' experiment; it might rather have been called '*infamous*' experiment upon vomiting. . . . Besides its atrocity, it was really purposeless." [2]

Of Magendie's cruelty we have thus the evidence of the best-known English physiologist of his day. Even by his own countrymen Magendie's pitilessness was

[1] Vivisection Report, 1876, Questions 2,347, 2,448, 2,582.
[2] Evidence before Royal Commission, 1875, Questions 444, 474.

denounced. Dr. Latour, the founder and editor of the leading medical journal of France—*L'Union Médicale*—has given us an incident which occurred in his presence, translations of which appeared in the editorial columns of the London *Lancet* and the *British Medical Journal*, August 22, 1863.

"I recall to mind a poor dog, the roots of whose vertebral nerves Magendie desired to lay bare to demonstrate Bell's theory, which he claimed as his own. The dog, already mutilated and bleeding, twice escaped from under the implacable knife, and threw his forepaws around Magendie's neck, licking, as if to soften his murderer and ask for mercy! Vivisectors may laugh, but I confess I was unable to endure that heartrending spectacle."[1]

The proof of Magendie's ferocious cruelty to his victims seems overwhelming. "In France," says Dr. George Wilson, "some of the most eminent physiologists have gained an unenviable notoriety as *pitiless torturers*, . . . experimenters who would not take the trouble to put out of pain the wretched dogs on which they experimented, even after they had served their purpose, but left them to perish of lingering torture. . . . It is pleasing to contrast the merciless horrors enacted by Magendie"—with the reluctance manifested by Sir Charles Bell.[2] Dr. Elliotson, in his work on Human Physiology, states that "Magendie cut living animals here and there, with no definite object *but to see what would happen.*"[3] In a sermon on cruelty to animals, preached at Edinburgh, March 5, 1826, by the Rev. Dr. Chalmers, the speaker especially alludes to "*the*

[1] The London *Lancet*, August 22, 1863.
[2] Wilson's "Life of Reid," p. 165.
[3] "Human Physiology," p. 428.

atrocities of a Magendie," then recently made known in England. The President of the Royal College of Surgeons, Sir James Paget, once testified that Magendie "disgusted people very much *by showing contempt for the pain of animals.*"[1] The great scientist, Charles Darwin, in a letter to the London *Times*, made reference to Magendie as a physiologist "*notorious*, half a century ago, *for his cruel experiments.*" "It is not to be denied 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 final report of the Commission, to which was affixed the name of Professor Thomas Henry Huxley, the most brilliant scientific writer of the last century.

Magendie left us a singularly truthful estimate of his own character and of his scientific accomplishments when he declared himself to be simply "a street scavenger (*un chiffonier*) of science. With my hook in my hand and my basket on my back, I ramble about the streets of science and gather up whatever I can find." The comparison was singular, but it was apt; he was, indeed, the ragpicker of physiology. With a scavenger's sense of honour he endeavoured to rob Sir Charles Bell of the credit for his discovery concerning the functions of the spinal nerves, by a prodigality of torment, from which the nobler nature of the English scientist instinctively recoiled. When there came to him an opportunity of experimenting on man, he embraced it with avidity, and again and again, while operating for cataract, plunged his needle to the bottom of the patient's eye, that he might learn the effect of mechanical irritation

[1] Evidence before Royal Commission, 1875, Question 371.

of the delicate organ of sight.[1] Some rags and tatters of physiology he bought—at the price of immeasurable torment—and held them up for the admiration of his contemporaries; but in the great conflict with disease and death it may be questioned whether he added a single fact that has increased the potency of medical art, the length of human life, or the sum of human happiness.

Such was François Magendie, physiologist and torturer, judged by scientific men and physiologists of a higher race, to whom compassion was not unknown. For undisguised contempt of pity, for delight in cruelty, for the infliction of refined and ingenious torment, he may have been equalled by some who followed and imitated him, but certainly he was never surpassed.

Another distinguished French *chiffonier* in the slum-districts of scientific exploration was Dr. L. J. Brachet, a contemporary of Magendie. In his day he was a man of extended reputation as a vivisector of animals. His principal work is entitled: " Recherches Expérimentales de Système Nerveux . . . par J. L. Brachet, Membre de l'Académie Royale de Médecine " and member of similar academies at Berlin, Copenhagen, and elsewhere; member of various medical societies of Paris, Lyons, Bordeaux, and Marseilles—the title-page of his book records his fame. It will be of interest to study the character of the experimentation, recorded by himself, upon which rests his eminence as a scientific man.

His first great " discovery " unfortunately has not

[1] Magendie naturally had no hesitancy in telling of these experiments made upon his patients " at the clinique of my hospital." See his " Elementary Treatise on Physiology " (translated by Dr. John Revere). New York, 1844, p. 64.

yet been accorded scientific acceptance. "It is little," he says, "to have proven the existence of sensibility in animals; I have proven that sensation pertains not merely to animals, but that it also is the property of vegetables—in a word, *of everything that lives*. Everywhere it acts in the same manner, through the nerves. The entire vegetable kingdom possesses the sense of feeling" (tous les vegetaux possedent la faculte de sentier).[1]

Had Brachet confined himself solely to experiments on the sensibility of plants, we should have little to criticize. Unfortunately, however, his scientific tastes led him in another direction. He belonged to a class of men who cannot permit the most apparent fact to be taken for granted, when, at the cost of torment, it may be demonstrated—men like Magendie, who insisted on proving to his students than an animal could really feel pain by stabbing it with his knife before commencing his experiment. Brachet's problem was a simple one. We all know, for instance, that an animal—a dog—may feel an intense dislike to some particular person. Why? Because of impressions conveyed to the brain of the animal by the senses of sight and hearing. Outside an asylum for idiots, it is probable that no one ever questioned the fact. Brachet, however, would not permit his readers to accept any statement merely upon the general experience of mankind, when it might be proven scientifically, and he has described in his book the experiments by which he claims to have demonstrated his theory.

"*Experiment* 162.—I inspired a dog with the strongest possible hatred for me by teasing it, and inflicting upon it some pain

[1] "Recherches," etc., p. 13.

every time I saw it. When this feeling had reached its height, so that the animal became furious whenever it saw or heard me, I put out its eyes [je lui fis crever les yeux]. I could then appear before it without its manifesting any aversion. I spoke, and immediately its barkings and furious movements permitted no doubt of the rage which animated it.

"I then destroyed the drum of the ears, and disorganized as much as I could of the inner ear. When the intense inflammation thus excited had rendered it almost deaf, I filled its ears with wax, and it could hear me no longer. Then I could stand by its side, speak to it in a loud voice, and even caress it, without awakening its anger; indeed, it appeared sensible of my caresses! There is no need to describe another experiment of the same kind, made upon another dog, since the results were the same."

By this great experiment, what valuable knowledge was conveyed? Simply that a dog, deprived of sight and hearing, will not manifest antipathy to a man it can neither see nor hear!

A true vivisector is never at a loss to invent excuse or occasion for an experiment. Dr. Brachet had made it clear that a dog will not manifest antipathy toward an enemy whose presence it cannot perceive; but suppose such a mutilated creature, in its darkness and silence, were subjected to some sharp and continuous physical pain, what then would happen? He proceeded to ascertain:

"*Experiment* 163.—I began the experiment on another dog by putting out its eyes [par crever les yeux], and breaking up the internal ears. Ten days later, *the suffering of the animal having apparently ceased,* after assuring myself that it could no longer see nor hear, I made a sore in the middle of its back. *Every moment I irritated this wound by picking it with a needle* [a chaque instant j'irritai sa plaie en la piquant avec un aiguillon]. At first the dog did nothing but yelp and try to escape, but the impossibility of this *forced him unceasingly to receive excruciating pain;* and finally the dog passed into a state of

frenzy so violent, that at last it could be induced by touching any part of its body. . . . The dog had no reason of hatred against any individual; . . . both sight and hearing had been destroyed; and many persons that the animal had never seen, provoked its rage by irritating the wound."

Of such an abominable experiment, however scientific it may appear, it is difficult to speak with restraint. To the average man or woman it will probably seem that nothing more fiendish or cruel can be found anywhere in the dark records of animal experimentation. Dr. Brachet was no obscure or unexperienced vivisector. At one time he was the professor of physiology in a medical school; he was a member of many learned societies at home and abroad. But think of an educated man procuring a little dog and deliberately putting out its eyes; then breaking up the internal ear, so that for many days the animal must have endured excruciating anguish from the inflammation thus induced; next, when the pain had somewhat subsided, creating a sore on the back by removal of the skin; and then, after comfortably seating himself in his physiological laboratory by the side of his victim, scientifically picking, and piercing, and pricking the wound, without respite—constantly, without ceasing—until the blinded and deafened and tortured creature is driven into frenzy by torments which it felt continually, which it could not comprehend, and from which, by no exertion, it was able to defend itself! Think of the scientist asking many other learned men to join him from time to time in the experiment, and to take part in picking at the wound, in tormenting the mutilated and blinded victim, and in driving it again and again to the madness of despair! Does anyone say that such experiment

could not be made to-day ? In one of the largest laboratories of America, and within ten years, an experiment equally cruel, equally useless, has been performed. The modern defender of unrestricted vivisection distinctly insists that no legal impediment should hinder the performance of any investigation desired by any experimenter. It was the editor of the *British Medical Journal* who once declared that " whoever has not seen an animal under experiment *cannot form an idea of the habitual practices of the vivisectors.*"[1] This accords with the statement of Dr. Henry J. Bigelow, for forty years connected with Harvard Medical School, that, aside from motives, painful vivisection differed mainly from other phases of cruelty " in being practised by an educated class, who, having once become callous to its objectionable features, find the pursuit an interesting occupation, under the name of Science."

And this was the case of Brachet. *He had become callous.* He found torment an " interesting occupation, under the name of Science." May there not be others in our day to whom the same criticism is only too applicable ?

One of the English critics of the abuses of vivisection a century ago was Dr. John Abernethy of London, a Lecturer on Physiology at the Royal College of Surgeons, the founder of the medical school attached to St. Bartholomew's Hospital, and the most distinguished surgeon in Great Britain during the first quarter of the nineteenth century. Abernethy was by no means an antivivisectionist; he insisted upon the utility of certain demonstrations, but he was profoundly opposed to

[1] *British Medical Journal*, September 19, 1863 (leading editorial).

those cruelties of research which, in our day, by the modern school of physiologists, are either forgotten or condoned. Curiously enough, one of his strongest utterances against such cruelty was made in one of his lectures on physiology. Therein he said:

"There is one point I feel it a duty to advert to. Mr. Hunter, whom I should not have believed to have been very scrupulous about inflicting suffering upon animals, nevertheless censures Spallanzani for the unmeaning repetition of similar experiments. Having resolved publicly to express my own opinions with regard to the subject, I choose the present opportunity, *because I believe Spallanzani to have been one of those who have tortured and destroyed animals in vain.* I do not perceive that in the two principal subjects which he has sought to elucidate he has added any important fact to our stock of knowledge; and, besides, some of his experiments are of a nature that a good man would blush to think of, and a wise man would have been ashamed to publish."[1]

This is a unique expression. One may be absolutely certain that no professor of physiology during the past forty years has thus openly condemned in a physiological lecture any of his contemporaries for the cruelty of their experiments.

In his Life of Abernethy, his biographer, Dr. Macilwain, refers to experiments upon living animals, "*which are so revolting from their cruelty*, that the mind recoils from the contemplation of them." This, too, is a noteworthy utterance, coming from one who was a distinguished London surgeon and a Fellow of the Royal Society. In a subsequent work entitled "Remarks on Vivisection," published some seventeen years before the date ascribed by Professor Bowditch as that mark-

[1] "Physiological Lectures," London, 1817, p. 164.

ing the beginning of criticism, he refers again to the views of Abernethy:

"As for experiments on living animals involving suffering, Mr. Abernethy disapproved of them, and seldom alluded to them but in terms of distrust, derision, or digust."

That the criticism of experimental cruelty did not begin in 1864, as imagined by Professor Bowditch, the quotations here given sufficiently demonstrate.

Beyond this demonstration, does the history of these savage tormentors have any lesson for us to-day? They belonged to another century. Should they not be forgiven, and their experiments condoned? Why not confine attention solely to the laboratory of to-day? Why blame Brachet and Magendie and Spallanzani, to whom anæsthesia was unknown?

There is a false suggestion in this protest, which, in one form or another, we hear often to-day. It is the gratuitous assumption put forth in defence, that if anæsthetics had only been known to physiologists before 1846, they would invariably have been used. Any such suggestion is manifestly false. If these experiments of Brachet and of others to be mentioned were to be made at all, it was necessary that the animal should be conscious of the agony it experienced. In the most complete laboratory for vivisection of the present time—in the Rockefeller Institute, for example—no scientist could drive a dog *into a frenzy* while it lies absolutely unconscious under the influence of chloroform! We may say this of the experiments of Magendie on the nervous system, for aside from the preliminary cutting operation, such experiments demanded the con-

sciousness of the victim. That which humanity has a right to censure in these physiologists is the spirit of absolute indifference to animal suffering, the willingness to subject a living creature to agony without adequate reason for the infliction of pain. The discovery of chloroform or ether made no change in human nature. Some of the worst of vivisections have been made, not merely since anæsthetics were discovered, but within the present century. Over twenty-five years after the properties of ether had been discovered, the most prominent vivisector in England told the Royal Commission that, except for teaching purposes, " I never use anæsthetics where it is not necessary for convenience," and that an experimenter " *had no time, so to speak, for thinking what the animal will feel or suffer.*" [1]

Unrestricted vivisection is the same to-day as a century ago. In many cases its operations involve little or no pain; in many cases there seems to be the same absolute indifference to the agony inflicted that was manifested by the vivisectors of a hundred years since. Where the law does not interfere, *everything is possible.* Whether there is cruelty or consideration depends upon the spirit of the vivisector. It was no ignorant layman, but the president of the American Academy of Medicine, who, in his annual address, declared that there were American vivisectors 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 of the public and the profession that their wickedness

[1] Evidence before Royal Commission, 1875, Questions 3,538, 3,540.

deserves."[1] And that vivisector of to-day, who suggests that if anæsthetics had been known to Magendie or Brachet, they would invariably have been used, is either ignorant or insincere. Surely he must know that the very nature of many of their experiments precluded the use of ether, and that in their time, as to-day, if the experiment were to be tried at all, it was necessary that the pain be felt.

There are other reasons why we should not permit the past to be forgotten. We are confronted by the challenge of the laboratory. Behind the locked and barred doors of the vivisection chamber, to which no man can gain admission unless known to be friendly to its practices, the vivisector of to-day challenges society to prove the existence of cruelty or abuse. The vivisector demands absolute freedom of action, he demands the most complete privacy, he demands total independence of all legal supervision—and then challenges the production of proof that any criticism is justified! Within the sacred precincts of the laboratory a Brachet, a Magendie, a Claude Bérnard may be experimenting to-day with a profusion of victims, protected by their seclusion from every possibility of complaint. For in what respect does the spirit that animates research to-day differ from that manifested by experimenters of the past? In all the literature of advocacy for unrestricted vivisection can one point out a word of criticism of Magendie or Brachet or Bérnard, or anything but expressions of exculpation, of admiration, and of praise? An English writer on animal experimentation, Mr. Stephen Paget,

[1] Address before American Academy of Medicine at Washington, D.C., May 4, 1891, by Theophilus Parvin, M.D., LL.D., professor in Jefferson Medical College of Philadelphia, Pa.

had occasion, in a recent work, to refer to the experimentation of both Magendie and Sir Charles Bell. Does he criticize or condemn Magendie's cruelty? No. He tells us, incidentally, that Bell always had "a great dislike to the school of Magendie," adding, with indifference, "*Let all that pass.*" These words aptly express the sentiment and the wish. Gladly, indeed, would the physiological laboratory hide the past from the memory of mankind; I do not believe in acceding to that desire. When the leading physiologist of his day, addressing an audience of physicians, refers to an early criticism of physiological cruelty as a collection of "blood-curdling stories," there is desire not to investigate, but to ridicule and discredit historic facts. When men of science put forth what they claim to be, "a plain statement of the whole truth," without one word of reference to the abuses of the past, they practically throw dust in the air to hide the truth from the public eye. That it may have been done ignorantly and without any wish to deceive is not sufficient to earn exculpation, for in either case the evil is accomplished.

Of one English physiologist of that period, Sir Charles Bell, it is impossible to speak except in terms of admiration and esteem. Born in 1774, his long and useful life terminated in 1842, four years before the discovery of anæsthesia. No one can read his correspondence with his brother, published many years after his death, without recognizing the innate beauty and nobility of his character. When news of the Battle of Waterloo reached England, he—the leading surgeon of his day—started for the battlefield. The story of his experience is one of the most graphic pictures of the effects of war

to be found in modern literature. It was Sir Charles Bell who made to physiology the greatest contribution which had come to it since the discovery by Harvey of the circulation of the blood, and yet this discovery was made by reasoning upon the facts of anatomy rather than by experimenting upon animals. An English physiologist, Sir Michael Foster, admits this:

"To Charles Bell is due the merit of having made the fundamental discovery of the distinction between motor and sensory fibres. Led to this view by reflecting on the distribution of the nerves, he experimentally verified his conclusions. . . ."

In his lectures on the nervous system Bell himself states that his discoveries, so far from being the result of vivisections, were, "on the contrary, deductions from anatomy; and I have had recourse to experiments, not to form my own opinions, but to impress them upon others."

That which determines the judgment of the world upon human actions is the spirit that animates them. Sir Charles Bell was not an antivivisectionist. When experiments upon animals seemed to him absolutely indispensable, he had recourse to them, but always with repugnance, and with desire to avoid the giving of pain. In his lectures on the nervous system he speaks thus of some of his work:

"After delaying long on account of the unpleasant nature of the operation, I opened the spinal canal. . . . I was deterred from repeating the experiment by the protracted cruelty of the dissection. I reflected that the experiment would be satisfactory if done on an animal recently knocked down and insensible."

And on another occasion, writing to his brother, he says:

"I should be writing a third paper on the nerves; but I cannot proceed without making some experiments, which are so unpleasant to make that I defer them. You may think me silly, but I cannot perfectly convince myself that I am authorized in Nature or Religion to do these cruelties. . . . And yet what are my experiments in comparison with those which are daily done, and are done daily for nothing?"

Such extreme sensibility, such sympathetic hesitancy to inflict great suffering in an attempt to discover some fact, would be ridiculed at the present day in every laboratory of Europe or America. It is typical, however, of a sentiment that once prevailed. Are we any better because it has so largely disappeared?

For great cruelty was there ever great remorse? The cases are not many; before the self-condemnation of a dying man and the final scene, friendship may feel it best to draw the veil. Yet one case of this poignant regret is worthy consideration, and shall have relation.

CHAPTER V

A VIVISECTOR'S REMORSE

About the middle of the last century there died in Scotland in the prime of life a physiologist, now almost forgotten, whose fate excited at the time an unusual degree of compassionate interest. Born in 1809, John Reid received his medical degree when but twenty-one years of age. A part of the two years following he spent in Paris, where Magendie was at the height of his notoriety for the ruthless cruelty of his vivisections. What attracted the young man we do not know, but Reid seems to have become greatly interested in physiological problems. Returning to Scotland, he pursued his investigations with all the zeal of youth, and apparently with little or no regard for the animal suffering he caused. For instance, of experiments which he made to prove a certain theory, he tells us:

"I have exposed the trunk of the *par vagum* in the neck of at least thirty animals, and in all of these the pinching, cutting, and even stretching of the nerve *were attended by indications of severe suffering*. It was frequently difficult to separate the nerve from the artery *on account of the violent struggles of the animal.*"[1]

[1] "Physiological Researches," by John Reid, p. 92. (In all quotations the italics are the compiler's.)

Regarding the pain inflicted by him in certain other vivisections, Reid is equally frank in his admissions:

"In repeated experiments upon the laryngeal nerves, we found in all animals operated upon (except two dogs, which appeared *considerably exhausted by great previous suffering*) ample ground for dissenting from the statements of Dr. Alcock. . . . With the exceptions mentioned, *very severe indications of suffering . . . attended the pinching and cutting of the nerve.*" [1]

Some physiological observers have remarked that among the more highly organized species of animals the creature struggles against the ligatures previous to a second operation more than it did at its first experience. It is evident that in such cases, in animals as well as among human beings, the memory of agony endured creates a mental condition of terror and fear. But what effect would the emotion of terror have upon the heart's action if certain nerves were first severed? Brachet relates an experiment wherein he tortured a dog in every conceivable way, yet the heart's action was not notably quickened if such nerves were first divided. Reid determined, therefore, to experiment for himself upon this emotion of *terror* induced by memory of previous pain, and six dogs were selected for his purpose. The nerves were first "cut in the middle of the neck, and a portion of each removed." He then tells us the results:

"After the operation, the pulsations of the heart were reckoned when the animal was lying or standing on the ground, and *after it had been caressed for some time to calm its fears.* It was then lifted up on the table, on which it had been tied, and operated upon; and after having been spoken to *harshly*, the pulsations were again reckoned."

[1] "Physiological Researches," p. 73.

In every case Reid noted that the heart's action increased from 20 to 40 beats per minute on lifting the animal to the vivisection table, whereon it had previously suffered torment. He adds:

"In these experiments it was particularly observed that the animals made no struggles in carrying them to and from the table, and consequently the increased excitation of the heart *must have arisen from the mental emotion of terror*. In a seventh dog this was conjoined with violent struggles. The pulsations, eight hours after the operation, were 130; *when placed on the table and made to struggle*, the pulsations were about 220; when he had been *subjected to pain*, and struggled more violently, they became so frequent that they could not be accurately reckoned. These experiments . . . prove that after the section of the vagi the pulsations of the heart may not only be quickened by muscular exertion, but also by *mental emotions*." [1]

Objection is often made to the citation of vivisections which occurred before the discovery of ether or chloroform. But in these experiments of Reid—as in those of Brachet—the use of anæsthetics, even had they been known to him, would have been a hindrance. *How can anyone experiment on the "mental emotions" of an animal while it is profoundly insensible to all external influences?* The idea is an absurdity. The biographer of Reid thus refers to this very point:

"Allusion has been made to the infliction of suffering on living animals. . . . This suffering was not merely incidental to dissections, but in many of the experiments recorded *was deliberately inflicted*. In many of the experiments, *even if anæsthetics had been known* at the period of his observations, *they could not have been employed*. . . . It was essential to the settlement of the question that the animal should be left *to exhibit all the pain it felt, and should be expressly subjected to torture*." [2]

[1] Reid, "Physiological Researches," pp. 168-171.

[2] "Life of John Reid," by Geo. Wilson, M.D., 1852, p. 153.

And precisely the same apology is put forward to-day. More than once, by high scientific authority, the public has been comfortably assured that nowadays "anæsthetics are always employed," in severely painful experiments, *except* "in those instances in which *the anæsthetic would interfere with the object of the experiment.*" Truly it is a broad exception. For all we know, it is the laboratory's excuse, even for the present-day repetition of the experiments of Magendie, Brachet, and Reid. "The anæsthetic would interfere." But what was the value of all this experimentation upon mind and body, this "mental emotion of terror" in a dog, this calming of its fear by caresses, followed by the torment of the operation? There was no value so far as the treatment of human ailments is concerned. Reid's experiments led to no change whatever in medical practice. Reading of certain experiments, one is constantly reminded of the old peasant's reply to his grandchild, who had found a skull on what once was a battlefield. Holding it in his hand, the old man told the story of the Battle of Blenheim, and the awful suffering it had caused:

> "'But what good came of it at last?'
> Said little Peterkin;
> 'Why, that I cannot tell,' quoth he,
> '*But 'twas a famous victory!*'"

At the early age of thirty-eight the physiologist seemed to see before him the bright prospect of a long and happy life. He possessed unusual physical strength, robust health, and a resolute and courageous spirit. His home was happy. No one considered him a cruel man; indeed, we are told, he was rather fond of animals.

"In his own house he always had pet dogs and cats about him, and he was as ready as Sir Walter Scott to rise from any occupation to humour their whims." In his profession he had made somewhat of a reputation, yet higher honours and wider renown and increased financial prosperity seemed almost certain to await him in the not distant future.

But one day, in November, 1847, he noted in himself the symptom of a disease that gave cause for alarm. The pain at first was doubtless insignificant, but the symptom occasioned anxiety because it would not disappear. Some of his friends were the best surgeons of Scotland, and he asked their advice. They were careful not to add to his discouragement, and they suggested the old, old formula—"rest and a change of scene." A year passed. The disease made constant progress, and there came a time when of its malignant character there could be no possible doubt. Finally, the vivisector recognized that it was not merely death which confronted him, but death by the most mysterious and agonizing of human ailments. In June, 1848, he wrote to a friend: "I have a strong conviction that my earthly career will soon come to a close, and that I shall never lecture again."

And then, gradually, to the ever-increasing agony of the body, came the anguish of *remorse*. He remembered the trembling little creatures which again and again he had lifted to their bed of torment, and "made to struggle," that he might observe how the heart-beats of a mutilated animal were quickened "from the emotion of terror"; and now, in the gloom of horrible imaginings, TERROR held *him* with a grasp

that would never loosen or lessen while his consciousness remained. He remembered the evidence of "severe suffering" he had so often evoked by the "pinching and cutting and stretching" of nerves; the creatures he had first "caressed to calm their fears"—and then vivisected; the eyes that so often had appealed for respite from agony—and appealed in vain; and now, NATURA MALIGNA, to whom pity is unknown, was slowly torturing him to death. He pointed to the seat of his suffering as being "*the same nerves* on which he had made so many experiments, and added: '*This is a judgment upon me for the suffering I have inflicted on animals!*'"[1]

More than once during the last months of his life he recurred to the same subject.

His biographer says:

"He could not divest his mind of the feeling that there was a special Providence in the way in which he had been afflicted. He had devoted peculiar attention to the functions of certain nerves, and had inflicted suffering on many dumb creatures that he might discover the office of those nerves; and *he could not but regard the cancer which preyed upon them—in his own body—as a significant message from God.*"[2]

Again and again he repeated the conviction to which his mind continually reverted in the midst of his torment. To him conscience brought no message of Divine approbation, but only a sentence of condemnation upon his past pursuits. Nor was Reid alone in this feeling of apprehension and questioning. We are told by his medical friend and biographer that many of his brother physicians were startled by learning

[1] "Life of John Reid," by Dr. G. Wilson, p. 273.
[2] *Ibid.*, p. 250.

" that Dr. Reid is doomed to die by a disease *which repeats upon his own body not in one, but in many ways,* the pains which he had imposed upon the lower animals."[1]

Undoubtedly, friends of the tormented vivisector attempted to comfort him with the assurance—so often repeated in our day—that his experiments on living animals had been carried on " for the benefit of sick and suffering humanity." But Reid was too honest a man to permit himself to be thus deluded while under the very shadow of death. For him the time had come when the specious apologies for the infliction of torture—so current in our day—could be of no avail in lessening the poignant feeling of Remorse. In the dying hour men speak the truth about their actions. It was so with Reid:

" He confessed to having thought much of Scientific *Fame* in his labours; and *it would be untrue to say that the alleviation of human suffering* was the motive always before him when he inflicted pain on the lower animals."[2]

An operation seemed to hold out hope of relief from his terrible agony. It was deemed best to perform it—as Reid had experimented—without anæsthetics, " that the sufferer, with every sensation and faculty alive, might literally become an operator upon himself." In the course of a second operation, Dr. Wilson tells us: " *The same nerves* and bloodvessels which had been the subject of Dr. Reid's most important inquiries *were laid bare in himself, by the surgeon's knife.*" But all remedial measures were in vain. The two years of apprehension, suspense, recognition, despair, of slowly increasing physical torment and the agony of remorse,

[1] Reid's " Life," p. 252. [2] *Ibid.*, p. 65.

came at last to an end. In July, 1849, he found the long-wished-for peace.

Seventy years ago the religious sentiment of Scotland easily favoured that doctrine of Divine displeasure which seemed probable to Reid and his friends. In our day, however, we are less certain of being able to interpret the "judgments of God"; and if we regard it as a remarkable coincidence, it is as far as we may safely go. Coincidences of some kind are a universal experience.

That notorious vivisector, Dr. Brown-Séquard, devoted many years of his life to experiments on the seat of all that is concentrated and exquisite in agony—the spinal cord. It was a curious coincidence certainly, that in his last days the vivisector was affected by a disease of the spinal cord, which at one time compelled him to go on all-fours like a beast. Even the remorse of Reid finds a parallel, for toward the end of his life, Haller, one of the greatest physiologists that ever lived, is said to have expressed in letters deep regret for the suffering he had inflicted upon living animals.

We cannot doubt, however, that the experience of excruciating agony affecting the very nerves upon which he had so often experimented must have brought to the dying man a deeper realization of the pain he had caused than he could otherwise have known. A noted surgeon, whose finger was the seat of a felon, asked his hospital assistant to lance it, at the same time cautioning him to be particularly careful to cause as little pain as possible. "Why, I've often heard you tell patients coming to the hospital not to mind the lancing—that the pain to be felt was really nothing at all," replied the assistant.

"Ah, yes," rejoined the surgical sufferer, "but then, remember, I was *at the other end of the knife!*" In watching the phenomena elicited by experiments upon animals, there have been vivisectors who forget what was felt "at the other end of the knife," and so became utterly oblivious to the suffering they caused. A leading physiologist of England once declared that he "*had no regard at all*" for the pain of an animal vivisected, and that "he had no time, so to speak, for thinking what the animal would feel or suffer"; that he never used anæsthetics, "except for convenience' sake." Can such a man realize the meaning of the word "*pain*"? Without sharp personal experience, can anyone, adequately comprehend what it signifies?

Remorse may be evidence, not so much of exceptional delinquency as of exceptional sensitiveness to ethical considerations. By the baser and more degraded souls it is rarely experienced. The greatest criminals usually meet their doom, untouched by any feeling of remorse. Perhaps it does not greatly matter how this infinite regret is occasioned. Sometimes—

> "... pain in man
> Has the high purpose of the flail and fan."

It separates and purifies. To one whose great suffering from disease is long continued, there must come a clearer vision of the infinite littleness of all transitory ambitions. Such supreme regret as that which came to Reid has great value. The poor soul once so longed for "fame"—which means only a little wider recognition to-day, and a little more enduring remembrance by posterity than that which is gained by the generality

of mankind. Of that horde of torturers, avid also for "fame," whose causation of unreckonable anguish brings into their ignoble natures no thought of pity, no emotion of regret, everyone comes at last to rest in that deep forgetfulness which he deserves. Here, however, is the story of one whose penitence gives reason for longer remembrance, who greatly erred and greatly suffered, whose contrition atoned, whose example admonishes—JOHN REID, physiologist.

CHAPTER VI

IS TORTURE JUSTIFIED BY UTILITY?

At every point in the discussion of vivisection we are confronted by the plea of utility. If, to some extent, we may admit the reasonableness of the argument, yet such admission must be with certain definite reservations. The infliction of extreme pain either upon human beings or on animals for objects other than their own benefit—how far is it to be justified if some useful end is thereby achieved? The subject is worthy of study.

The utility of judicial torture as a method of securing the confession of criminals does not seem to have been questioned for hundreds of years. The Romans often put all their slaves to torture as soon as any crime occurred, of which some of their servants could have been aware. That sometimes the innocent suffered beyond endurance and falsely confessed seemed to our forefathers no reason whatever for changing an ancient custom, so often productive of useful ends. Mysterious crimes, which under our modern methods of investigation escape detection, were frequently brought to light in earlier times simply by the threat of torment and the sight of the executioner. There can be no question that in innumerable cases the torture of accused criminals whose guilt was almost certain, yet not absolutely

proven, served to further the ends of Justice. If modern civilization condemns the torture of suspected lawbreakers, it is upon other grounds than that Justice finds it useless in every case.

The public punishment of great offences against the State—punishment accompanied with ignominy and extreme torment—seemed to our ancestors equally justified by utility. If an old woman were convicted of witchcraft—and nobody questioned the actuality of the offence two hundred and fifty years ago—her punishment by burning at the stake certainly might be expected to deter others from entering into compacts with the Evil One. If heresy and unbelief lead not only the sceptic himself, but all who follow his teaching, into eternal darkness, there seemed to our forefathers no surer method of checking the first tendencies toward intellectual revolt, and saving innumerable souls, than by delivering the heretic to the flames, and accompanying his execution by everything calculated to excite popular derision and execration. The public punishment of treason, and particularly of attempted or achieved assassination of the sovereign or head of the State, was made as excruciating and terrible as possible, in order *that example might deter.*

We speak somewhat vaguely to-day of such tortures and their atrociously horrible accompaniments. It may be worth while to see just what they were. Two or three centuries ago civilized nations considered that *if torment was useful it was justifiable.* There are three cases which stand out in history with especial distinctness, the details of which are little known, and I propose to cite them simply as evidence of the extent to which judicial

torment was carried, but a little while ago, among some of the most enlightened and progressive nations of modern times.

If ever the assassination of a Prince deserved the severest punishment, it was the murder in July, 1584, of William the Silent, the leader of the Protestants of Holland in their struggle for independence from Spanish dominion. The sentence pronounced upon the murderer, Balthazar Gerard, a mere hired assassin, was carried out within ten days after commission of the crime. A contemporary writer, apparently an eye-witness of his execution, speaks of Gerard as one "whose death was not of a sufficient sharpness for such a caitiff, and yet too sore for any Christian." His description of the murderer's execution is as follows:

"The order of the torment was four days. He had the first day the strappado openly, in the market; the second day, whipped and salted, and his right hand cut off; the third day, his breasts cut out, and salt thrown in, and then his left hand cut off. The last day of his torment, which was the 10th of July, he was bound to two stakes, standing upright, in such order that he could not shrink down nor stir any way. Thus standing, naked, there was a great fire placed some small distance from him, wherein was heated pincers of iron, with which pincers two men did pinch and pull his flesh in small pieces from his bones throughout most parts of his body. Then was he unbound from the stakes and laid upon the earth, and again fastened to four posts; then they ripped him up, at which time he had life and *perfect memory*."[1]

Thus did Holland, a leading civilized nation, attempt to deter assassins from assaulting her rulers.

[1] Harl. Misc., vol. iii., p. 200. "Printed at Middleborough, Anno 1584." The above account is taken from a rare publication, in the British Museum Library. Motley's account of Gerard's torment includes elements of horror not mentioned by this writer.

Three centuries ago in May, 1610, Henry IV., King of France, was struck down by the dagger of Francis Ravilliac; and France, the leading civilized nation of Europe, determined that the punishment of the crime should be so horrible that it might be expected for ever to deter others from imitating his offence. Standing in a tumbril, naked in his shirt, with the knife wherewith he had stabbed the King chained to his right hand, Ravilliac was carried to the doors of the Church of Notre Dame, where he was made to descend, and to do penance for his crime.

"After this was he carried to the Greve, where was builded a very substantial scaffold of strong timber, whereupon he was to be tormented to death. By the executioners, he was bound to an engine of wood and iron, made like to a St. Andrew's Cross; and then the hand, with the knife chained to it, wherewith he slew the king, and half the arm, was put into an artificial furnace, then flaming with fire and brimstone . . . yet nothing at all would he confess, but yelled out with such horrible cries, even as it had been a Divill or some tormented soul in hell . . . and though he deserved ten times more, yet humane nature might inforce us to pity his distress. After this with tongs and iron pincers made extreme hot in the same furnace, the executioners pinched and seared his breasts, his arms, and thighs and other fleshy parts of his body, cutting out collops of flesh and burned them before his face; afterward into the same wounds thus made, they poured scalding oil, rosen, pitch and brimstone . . . yet he would reveal nothing but that he did it of himself . . . because the King tolerated two religions in his kingdom . . . but cried out with most horrible roars, even like the dying man tormented in the brazen bull of Philaris."

Finally, his body was torn to pieces by four strong horses, the remains gathered and burnt, and the ashes scattered to the winds. "God in His justice," piously observes the narrator, "will, I hope, in like manner

reward all such as desperately attempt to lift their hands against the Lord's Anointed."[1]

Almost a century and a half passed before the Place de Greve, in Paris, again witnessed the torment of a fanatic for an attack upon the sacred person of a King. On January 5, 1757, Louis XV. was slightly wounded by a young Frenchman, Robert François Damiens. The injury was not severe, and the King's recovery was soon complete. Such an attack, however, was a capital offence, and it was determined that the criminal should not only lose his life, but that he should be made to undergo every possible addition of torment and agony. On the morning of March 28, 1757, Damiens was subjected to torture, in order to induce him to reveal the names of any accomplices. In the extremity of his agony he appeared at one time to lose consciousness; but the surgeon and the physician—" qui font toujours présent à la torture "—declared him still conscious, and the torment continued, accompanied by " terrible cries." When he had been for two hours and a quarter in the hands of the tormentors, the physician and surgeon gave it as their opinion that to continue might lead to an " accident," and the doomed wretch was taken to his dungeon, in order to recuperate.

Toward three o'clock of the afternoon the same day, Damiens was notified that everything was in readiness for his execution. Clothed in but a single garment, he was made to mount a tumbril, and was carried to the doors of the Cathedral of Notre Dame. Descending

[1] Harl. Misc., vol. vi., p. 607. "The Terrible and deserved death of Francis Ravilliac, showing the manner of his strange torments at his execution, the 25th of May last past, for the murther of the late French King, Henry IV."

from the cart, holding a lighted candle in his hands, he knelt and made "*l'amende honorable,*" after the form prescribed. It is but a short distance from the Church of Notre Dame to the Place de Greve. Here a vast crowd had gathered in order to witness the extremest agony of a dying man. Members of the French aristocracy were present; ladies of quality paid vast sums for the occupancy of windows overlooking the square, and played cards to pass the time until the spectacle of torment should begin. A scaffold about 9 feet square received the executioners and their victim. The tortures were of the same character as those inflicted in the same place upon the assassin of Henry IV. There was the burning of the right hand, the mutilation of the body and limbs, the pouring of melted lead and other substances into bleeding wounds. Terrible cries, "heard at a great distance," were induced; there were shrieks for pity; there were prayers to God for strength to endure: "*Mon Dieu, la force! la force! Seigneur mon Dieu, ayez pitie de moi! Seigneur mon Dieu, donnez-moi la patience!*" Prayers for patience, for strength to suffer and endure—these his only petitions in the supreme agony.

At last came the final act of the tragedy. Four young and vigorous horses were attached, each to a seared and lacerated limb, and the attempt was made to rend asunder the still living body. The horrible spectacle lasted for more than an hour. Finally the surgeon and the physician in attendance gave it as their opinion that complete dismemberment could not be effected except after a partial severance of the limbs. The operation was performed, the horses were again attached, and the

fearful spectacle came to an end. Damiens apparently preserved consciousness even after both legs and an arm had been torn from his body. The remains were gathered and burnt on the place of torment, and the noble lords and ladies who had gloated over the scene returned to their homes. It is not at all improbable that among those who witnessed the torments of Damiens in 1757 for an assault upon a King's sacred person there were some who lived to see Louis XVI. mount the scaffold in 1793.[1]

I have quoted at length three cases of judicial torture, occurring among Christian nations, which were then in the front rank of modern civilization. In Turkey and in Egypt, in India and in China, among the savage Sioux and Iroquois of North America, the tragedies of prolonged torment were more frequent, but not more horrible. But in what way do such records of torture concern the abuses of vivisection?

For two reasons they are suggestive. Not infrequently it is intimated that reports of cruelty by physiologists cannot be true: they are merely "blood-curdling stories"; their horror makes the charge beyond possibility of belief. A physiologist cannot have been so cruel, and yet have seemed so gentle, so benevolent, so mild. Here are presented the records of torment inflicted upon human beings: torments approved by the highest legal authorities; torments to the supervision of which even medical science, in one case at least, lent its representatives to assist the torturers; and if the

[1] See "Pièces Originales des Process fait a Robert François Damiens, Paris," 1757, vol. iii., pp. 379-409; and Perkin's "France under Louis XV.," vol. ii., p. 87.

facts were not so well attested, they, too, would pass belief. But we know they are not fictions; they were actualities. To push them out of recollection into forgetfulness is to unlearn one of the chief lessons that History can teach us—the lesson of warning. The atrocities of biological experimentation can no more be dismissed with a shrug of incredulity than one can sneer at the agonies of Gerard or Damiens because they, too, suggest a heartlessness in the men of that time which our finer civilization can hardly conceive.

But the chief lesson of this black chapter of history concerns the great question of utility. That these atrocious torments were inspired simply and solely by an intense passion for revenge is an immeasurably dishonouring imputation. For the statesmen not only, but the religious leaders of that period, believed—and justly believed—in the usefulness of public torture; they believed that the fear of an ignominious and horrible death amid the jeering cries of the surrounding populace would tend to hinder others from repeating the offence. The utility of Terror as a deterrent they knew—as France knew it in '93, as the Spanish Inquisition knew it for nearly three centuries, as every nation knew it in times of popular insurrection or foreign wars. What Civilization came at last to recognize was that *utility of torture, no matter how great, could not justify its use.* This principle in its application to the punishment of human beings has been universally recognized by every civilized nation in the world. It only remains for the future Civilization to recognize it so far as concerns beings inferior to ourselves. The repetition by students in a laboratory of an experiment upon the nervous

system of a dog, simply to demonstrate well-known facts, tends, perhaps, to fix them in memory; but that degree of utility does not justify the torture. "The time will come," said Dr. Bigelow of Harvard Medical School, "when the world will look back to modern vivisection in the name of Science as it now does to burning at the stake in the name of Religion."

CHAPTER VII

THE COMMENCEMENT OF AGITATION

THE student of history, attempting to trace the agitation for reform of vivisection, is early confronted by a curious fact. It is the ignorance which generally prevails concerning the part borne by the medical profession in exciting public attention to the cruelties of experimentation. The present generation of scientific teachers, of medical students and physicians, are as a rule profoundly ignorant of the beginning of the controversy, and would be as surprised as Professor Osler of Oxford University seems to have been surprised, to hear that medical journals first made known to the world the abuses of vivisection. Remembering how vigorously the physiological laboratory of to-day resists and resents either investigation or criticism, one is forced to confess that rarely, if ever, in the history of the world has a transformation of ideals been more completely attained. If the followers of Wilberforce and Clarkson, to whom the world is indebted for the great impulse against negro slavery, were to-day organized for the exploitation of the negroes on the Congo, or the Indians on the Amazon, or for carrying on the slave-trade secretly, without restriction or supervision, the condition of affairs could hardly be more singular than the dominance obtained by the physiological

laboratory upon the medical conscience of to-day. The facts constitute a remarkable chapter of human experience; and though once before they have been stated by the present writer, it is evident, by the evidence given before the Royal Commission, that a vast amount of ignorance yet remains to be dispelled.

Up to a period considerably beyond the middle of the last century, the sentiment of the medical profession in England was practically unanimous in condemning the methods of vivisection which prevailed on the Continent of Europe. In 1855 the science of bacteriology was unknown. It is possible that not more than half a dozen English physiologists at that time were making experiments on living animals. It was not even regarded as an essential in the teaching of medical schools. In 1875 some of the most distinguished surgeons and physicians of Great Britain testified before the Royal Commission that as medical students they had never witnessed an experiment on a living animal.

That the agitation against the cruelties of vivisectors which made itself evident during the last half of the previous century had no origin in ignorance is easily demonstrated. It was the medical journals of England which first made known to the world the atrocities perpetrated in the name of Science in Continental laboratories. In our own day, when some of the leading teachers in medical schools have only scorn for those who denounce cruelty in the laboratory, it is worth while to study the sentiments of an earlier generation, when sympathy for animal suffering was not a subject for mockery.

The *Medical Times and Gazette* of London was one of the earlier of medical journals to denounce the cruelties perpetrated by vivisectors abroad. In its issue of September 4, 1858, its editor says:

"In this country we are glad to think that experiments on animals are never performed nowadays except upon some reasonable excuse for the pain thus wilfully inflicted. We are inclined to believe that the question will some day be asked, whether any excuse can make them justifiable? One cannot read without shuddering details like the following. It would appear from these that the practice of such brutality is the everyday lesson taught in the veterinary schools of France.

"A small cow, very thin, and which had undergone numerous operations—that is to say, *which had suffered during the day the most extreme torture*—was placed upon the table, and killed by insufflation of air into the jugular vein." [1]

This fact is related by M. Sanson, of the veterinary school of Toulouse, merely incidentally, when describing an experiment of his own upon the blood. The wretched animal was actually cut to pieces by the students! . . . M. Sanson adds (merely wanting to prove that the nervous system of the animals upon which he operated was properly stirred up): 'Those who have seen these wretched animals on their bed of suffering—*lit de douleur*—know the degree of torture to which they are subjected; torture, in fact, under which they for the most part succumb!'"

A little later the same medical journal again touched the subject of vivisection in its editorial columns. In its issue of October 20, 1860, the editor is even more emphatic in denunciation:

"Two years ago we called attention to the brutality practised at the veterinary schools in France, and gave a specimen of the kind of torture there inflicted upon animals. *We are very glad to see that the public are now occupied with the subject,* and we are sure that the Profession at large will fully agree with us *in condemning experiments which are made simply to demonstrate*

[1] In all extracts italics are the compiler's.

physiological or other facts which have been received as settled points and are beyond controversy. We consider the question involved as one of extreme interest to the Profession, and we shall gladly throw open our columns to any of our brethren who may wish to assist in framing some code by which we may decide under what circumstances experiments upon living animals may be made with propriety."

The words italicized in the foregoing quotation are of special significance to-day. The editor is "very glad" to note the interest taken in the subject by the general public—a sentiment quite foreign to that of the present time. One notes, too, the gratifying assurance that the medical profession of England at that period would "fully agree in condemning experiments," which nowadays are made not only in medical schools, but to some extent in every college of any standing in the United States. And this condemnation on the part of the medical profession was voiced four years before the date assigned by Professor Bowditch as that of "the first serious attack upon biological research in England."

A few months later the same medical periodical outlined the principles which it believed should govern the practice of animal experimentation. In the issue of this journal for March 2, 1861, the editor makes the following pronouncement:

"VIVISECTION.—We have been requested to pronounce a condemnation of vivisection. . . .

"We believe that if anyone competent to the task desires to solve any question affecting human life or health, or to acquire such a knowledge of function as shall hereafter be available for the preservation of human life or health, by the mutilation of a living animal, he is justified in so doing. But we do not hesitate to condemn the practice of operating on living animals for the mere purpose of acquiring coolness and dexterity, and

we think that the repetition of experiments before students, merely in order to exhibit them as experiments, showing what is already known, is equally to be condemned."

Again, on August 16, 1862, the *Medical Times and Gazette* gives an expression of its views on the subject. It condemns the cruelty of Magendie, concerning which one will seek vainly to-day in medical periodicals for any similar expression of reprobation. Referring to the subject, the editor says:

"No person whose moral nature is raised above that of the savage would defend the practices which lately disgraced the veterinary schools of France, or in past years the theatre of Magendie.[1] Professor Sharpey, in his address to the British Medical Association, has accurately drawn the required limits, by asserting that where the result of an experiment has been fully obtained and confirmed, *its repetition is indefensible;* and 'as the art of operating may be learned equally on the dead as on the living body, operations on the latter for the purpose of surgical instruction are reprehensible and unnecessary.'"

To the London *Lancet* the cause of humaneness to animals is also indebted, for its repeated condemnation of the cruelties of vivisection. As the exponent and representative of British surgery, its words undoubtedly carried great weight among medical practitioners. In its issue of August 11, 1860, after pointing out the utility of certain physiological inquiries, the *Lancet's* editor thus defines what it regards as reprehensible cruelty:

"On the other hand, when at any moment the practice overpasses the rigorous bounds of utility, when its object is no longer the pursuit of new solutions of scientific problems, or the examination of hypotheses requiring a test; when vivisection is elevated into an art, and this art becomes a matter of public

[1] The lecture-room in which vivisections were publicly performed.

demonstration—then it is degraded by the absence of a beneficent end, and becomes a cruelty. Thus *the exhibitions of experiments which aim only at a repetition of inquiries already satisfactorily concluded,* and the *demonstration of functions already understood,* appear to us to rank among the excesses which must be deplored, if not repressed. The displays in these amphitheatres are of the most painful kind, and it is to be deeply regretted that curiosity should silence feeling, and draw spectators to mortal suffering. . . . The Commission (of the Societies for Prevention of Cruelty) asks for nothing which the most zealous devotees of science cannot—and ought not—to grant. It demands only the cessation of experiments which are *purely repetitive demonstrations of known facts.*"

This is a remarkable utterance. It is quite probable that it voiced an almost unanimous opinion among English physicians and surgeons of half a century ago. How far we have strayed since then! The *Lancet* of to-day would doubtless earnestly oppose any legal prohibition of experiments which it once ranked among the " excesses which must be deplored, *if not repressed.*"

Two or three months afterward the *Lancet* again expressed its condemnation of experiments made for the demonstration of known facts. In its issue of October 20, 1860, the *Lancet* editor says:

" The moment that it [vivisection] overpasses the bounds of necessity; when it ceases to aim at the solution of problems in which humanity is interested, and becomes a new means of public demonstration, having no benevolent end—then it is degraded to the level of *a purposeless cruelty.* The repetitive demonstration of known facts, by public or private vivisections, is an abuse that we deplore, and have more than once condemned."

On January 12, 1861, the *Lancet* opens its columns to a correspondent, who invites attention of its readers to the views of Professor Owen, afterward Sir Richard

Owen, and the most distinguished anatomist of his time:

"Professor Owen, one of the first physiological authorities of the present day, observes: 'That no teacher of physiology is justified in repeating any vivisectional experiment, merely to show its known results to his class or to others. *It is the practice of vivisection,* in place of physiological induction, pursued for the same end, *against which humanity, Christianity, and Civilization should alike protest.*'"

It is probable that no stronger denunciation of the cruelty of vivisection ever appeared than that contained in the leading editorial of the London *Lancet* of August 22, 1863. The writer was certainly not an opponent of all experiments upon animals; he admits that "if pressed for a categoric answer whether such a practice as vivisection were permissible under proper restrictions for the purpose of advancing science and lessening human suffering, the answer would be in the affirmative." But the practice is evidently spreading. It is asserted that experiments upon animals "are a common mode of lecture illustration," and that such investigations "have spread from the hand of the retired and sober man of matured science into those of everyday lecturers and their pupils." Against such extension of vivisection the editor of the *Lancet* enters an emphatic protest:

"If we were pressed simply for a categoric answer to the question whether such a practice [as vivisection] were permissible under proper restrictions and for the purpose of advancing science and lessening human suffering, we need hardly say that the answer would be in the affirmative. It is asserted, however, that the practice of vivisection and such investigations as are implied by this term, 'have spread from the hands of the retired and sober man of matured science into those of every-

day lecturers and their pupils,' and that such experiments 'are a common mode of lecture illustration. . . .'

"We will state our belief that there is too much of it everywhere, and that there are daily occurring practices in the schools of France which cry aloud in the name both of honour and humanity for their immediate cessation. About two years ago, our Royal Society for Prevention of Cruelty to Animals became possessed of the knowledge that it was still the practice in the schools of Anatomy and Physiology in France for lecturers and demonstrators to tie down cats, dogs, rabbits, etc., before the class; to perform upon them operations of great pain, and to pursue investigations accompanied by most terrible torture. *This, too, for the purpose only of demonstrating certain facts which had been for long unhesitatingly admitted,* and for giving a sort of meretricious air to a popular series of lectures. It learned, moreover, that at the veterinary schools of Lyons and Alfort, live horses were periodically given up to a group of students for anatomical and surgical purposes, often exercised with . . . extra refinements of cruelty. . . ."

It appeared that at Paris the whole neighbourhood adjoining the medical school—including patients in a maternity hospital—"were constantly disturbed, when the course of physiology was proceeding at the school, by the howling and barking of the dogs, both night and day." The dogs were silenced. "The fact was, the poor animals were now subjected to the painful operation of dividing the laryngeal nerves as preliminary to the performance of other mutilations! And what were these dogs for? Simply for the vain repetition of clap-trap experiments, by way of illustrations of lectures for first-year students! These facts becoming known, the general public has at length interfered, and, we think, with very great propriety. *The entire picture of vivisectional illustration of ordinary lectures is to us personally repulsive in the extreme.* Look, for example, at the animal before us, stolen (to begin with) from his master; the poor creature hungry, tied up for days and nights, pining for his home, is at length brought into the theatre. As his crouching and feeble form is strapped upon the table, *he licks the very hand that ties him!* He struggles, but in vain, and uselessly expresses his fear and suffering until a muzzle is buckled on his jaws to stifle every sound. The scalpel penetrates his quivering flesh. One effort only is now natural until his powers are ex-

hausted—a vain, instinctive resistance to the cruel form that stands over him, the impersonation of Magendie and his class. 'I recall to mind,' says Dr. Latour, 'a poor dog, the roots of whose vertebral nerves Magendie desired to lay bare to demonstrate Bell's theory, which he claimed for his own. The dog, already mutilated and bleeding, twice escaped from under the implacable knife, and threw his front paws around Magendie's neck, licking, as if to soften his murderer, and ask for mercy! Vivisectors may laugh, but I confess I was unable to endure that heartrending spectacle.' But the whole thing is too horrible to dwell upon. Heaven forbid that any description of students in this country should be witness to such deeds as these! We repudiate the whole of this class of procedure. Science will refuse to recognize it as its offspring, and humanity shudders as it gazes on its face."

In all the literature of what is known as "antivivisection" is it possible to find a more emphatic condemnation of scientific cruelty than this? The decadence of humane sentiment in the laboratory can hardly be more strikingly illustrated than by a comparison of this editorial utterance of the *Lancet* with some of the present-day expressions of opinion in medical journals. When a quotation from this editorial was brought to the attention of a professor in Cambridge University not long since, it seemed to him so incredible that he made "a special inquiry," and then felt safe in publishing a doubt of its authenticity. If, as one may perhaps imagine without undue violence to probability, this "special inquiry" was made in the editorial rooms of the journal in question, the incredulity which even there found expression only illustrates the gulf that lies between the present and the past. It is a marvel, indeed, that the humane sentiment of that earlier period, before the dominance of Continental ideals became an accomplished fact in America and England, can be so

utterly forgotten by the medical journals and medical teachers of the present time.

A week later the *Lancet* again discusses the subject, always, it should be remembered, as the advocate of vivisection, provided the practice be carried on under humane restrictions. A few sentences of the editorial of August 29 are specially significant:

"... As a general rule, neither our [British] students nor teachers are wont to carry on experiments upon living animals even in a private way. The utmost that can be said is that perhaps some two or three—at the most six—scientific men in London are known to be pursuing certain lines of investigation which require them occasionally during the year to employ living animals. ... Whilst the schools of medicine in this country are as a rule not liable to the charge of vivisectional abuses as regards the higher animals, we cannot altogether acquit them from a rather reckless expenditure of the lives and feelings of cold-blooded creatures. ... The reckless way in which we have sometimes seen this poor creature [the frog] cut, thrown and kicked about, has been sometimes sickening. ... We cannot help feeling there is both *a bad moral discipline for the man*, as well as an amount of probable pain to the creature, in such a practice."

How strange such criticism as this appears to-day! Can one imagine a medical journal in America or England expressing in our time any sympathy for the suffering of frogs in a physiological laboratory? Can one fancy on the part of its editor a suggestion of "bad moral discipline" which the ruthless vivisection of animals of the highest organization or grade of intelligence might induce? To-day such criticism is unthinkable. Yet the capacity of animal suffering has not diminished. The number of victims is vastly larger. What change has occurred which makes it impossible to conceive on the part of a medical journal of the present time the

expression of such a sentiment of pity for one of the lower forms of animal life ?

The *Lancet* was not alone in such condemnations. No periodical of that day, devoted entirely to the problems of medicine, occupied a position of influence equal to that of the *British Medical Journal.* One of its earlier editorial utterances concerning vivisection appeared in its issue of May 11, 1861, three years before the date given by Dr. Bowditch as that of " the first serious attack."

" The Emperor of the French has received a deputation from the Royal Society for the Prevention of Cruelty to Animals. We sincerely trust that this interview may be the means of putting an end to the unjustifiable brutalities too often inflicted on the lower animals under the guise of scientific experimentation. *It has never appeared clear to us that we are justified in destroying animals for mere experimental research under any circumstances ;* but now that we possess the means of removing sensation during experiments, the man who puts an animal to torture ought, in our opinion, to be prosecuted."

Referring to the experiment upon a cow mentioned in Dr. Brown-Séquard's *Journal of Physiology,* and already described, the editor adds:

" We are not disposed, in a question of this kind, in which some of the highest considerations are concerned, to allow our opinion to be swayed by the opinions or the proceedings of even the greatest surgeons and the greatest physiologists. That such authorities performed vivisection is a fact; but it does not satisfy us that the proceeding is justifiable. Under any circumstances, this much, we think, is evident enough: that *if vivisections be permissible, they can only be so under certain limited and defined conditions.* We need hardly add that these conditions have not yet been laid down. Altogether, the subject is one well worthy of serious discussion, and gladly would we see the interests of medical science in the matter properly reconciled with the dictates of the moral sense."

Nothing could be more clearly stated. One reads almost with a feeling of amazement the sentences we have italicized in the foregoing quotation. Here, in the editorial columns of the principal medical journal in the world, is expressed doubt of the justification of any destruction of animals whatever, "for mere experimental research." What magnificent independence of the opinions and experimentation "of even the greatest surgeons and the greatest physiologists" is here displayed!

Five months later the *British Medical Journal* in its editorial columns again refers to the peculiarly atrocious vivisection which it had once before denounced; it is evident that the journal intends that such actions shall not be forgotten. In the issue of October 19, 1861, it says:

"The brutalities which have been so long inflicted upon horses, etc., in the veterinary schools of France under the name of Science are perfectly horrible. Some idea of what has been daily going on in those schools during many past years may be obtained from such a statement as the following, taken from a paper by M. Sanson, in the *Journal of Physiology* [edited by Dr. C. E. Brown-Séquard]. M. Sanson is speaking incidentally of the condition of the animals upon whose blood he was himself experimenting: 'A small cow,' he writes, 'very thin, and which had undergone numerous operations—that is to say, *which had suffered during the day the most extreme torture*—was placed upon the table,' etc. M. Sanson adds '. . . Those who have seen these wretched animals on their bed of suffering—*lit de douleur*—know the degree of torture to which they are subjected; torture, in fact, under which they for the most part succumb!' *The poor brutes are actually sliced and chopped, piecemeal, to death,* in order that the *élèves* (students) may become skilful operators!"

Almost a year passes, and on September 6, 1862, we again find the editor of the *British Medical Journal* dis-

cussing the ethics of animal experimentation. He admits that there is useless vivisection and unnecessary infliction of pain. Significant, indeed, it will seem to the physician of to-day to find one of the leading exponents of medical opinion condemning as "unjustifiable" demonstrations of well-known facts, which are now considered as essential to medical education. After stating that some restrictions should be imposed, the editor adds:

"We will venture to suggest that these restrictions should be well and clearly defined; that some high authority like Dr. Sharpey himself should lay down certain rules on the subject, and for the purpose of preventing, if possible, any needless suffering from being inflicted experimentally on the lower animals. All of us must be well aware that many needless experiments are actually performed, and until some clearly defined rules on this head are laid down, we venture to think such needless suffering will still continue to be inflicted on animals. If, for example, it were publicly stated by authorities in the profession that experiments of this nature, made for the mere purpose of demonstrating admitted physiological facts, are unjustifiable, a great step would be gained, and a great ground of complaint cut from under the feet of the enthusiastic anti-vivisection societies. The very fact of an authoritative declaration on this point would go far toward giving an authoritative sanction to the legitimate performance of such experiments. . . ."

The denunciations of cruel vivisection by the *British Medical Journal* extend over a considerable period. Occasionally the *Journal* quotes the opinions of some of its medical contemporaries in Paris, admitting the need for reform. For instance, in its issue of May 2, 1863, in its editorial columns, the *Journal* presents us with a quotation from *L'Union Médicale* of Paris, suggesting distinctions that should be made in the selection of vivisection material:

"Vivisection is often useful and sometimes necessary, and therefore not to be absolutely proscribed; but I would gladly petition the Senate to forbid its performance on every animal which is useful to, and a friend of, man. The mutilations and tortures inflicted upon dogs are horrible. The King of Dahomey is less barbarous than these merciless vivisectors. *He* cuts his victims' throats, but without torturing them; while *they* tear and cut to pieces these wretched dogs in their most sensitive parts. Let them operate on rats, foxes, sharks, vipers, and reptiles. But no; our vivisectors object to the teeth, the claws, the beaks of these repulsive animals; they must have gentle animals; and so, like cowards, they seize upon the dog—that caressing animal, which licks the hand, armed with a scalpel!"

Think of a such quotation in the columns of the *British Medical Journal*—a periodical which to-day rarely ventures to criticize any phase of animal experimentation!

The following summer, on August 22, 1863, the *Journal* finds space in its editorial pages for yet other quotations from French medical periodicals concerning the "enormous abuses" of vivisection.

"We are very glad to find that the French medical journals are entering protests against the cruel abuse which is made of vivisection in France. *L'Abeille Médicale* says:

"'I am quite of your opinion as to the enormous abuses practised at the present day in the matter of vivisection. . . . In the laboratories of the *College of France*, in the *École de Médecine*, eminent professors, placed at the head of instruction, are forced to the painful sacrifice of destroying animals in order to widen the field of science. In doing so they act legitimately, and suffering humanity demands it of them. Those experiments are performed in the silence of the private study, and the results obtained are then explained to the pupils, or treated of in publications. . . . But to repeat the experiments before the public, to descend from the professional chair in order to practise the part of a butcher or of an executioner, is painful to the feelings and disgusting to the sentiments of the student. . . . Such

public exhibitions are ignoble, and of a kind which pervert the generous sentiments of youth. An end should be put to them. Ought we to allow the *élite* of our French youths to feed their eyes with the sight of the flowing blood of living animals, and to have their ears stunned with their groans, at this time when society is calling for the doing away of public executions? Let no one tell us that vivisections are necessary for a knowledge of physiology. . . . If the present ways, habits, and customs are continued, the future physician will become marked by his cold and implacable insensibility. Let there be no mistake about it: *the man who habituates himself to the shedding of blood, and who is insensible to the sufferings of animals, is led on into the path of baseness.'*

"So writes *L'Abeille Médicale*. But here *L'Union Médicale* takes up and comments on the tale:

"'This is all excellently said; but we must correct a few errors. Magendie, alas! performed experiments in public, and sadly too often at the *Collège de France*. I remember once, among other instances, the case of a poor dog, the roots of whose spinal nerves he was about to expose. Twice did the dog, all bloody and mutilated, escape from his implacable knife, and twice did I see him put his forepaws around Magendie's neck and lick his face! I confess—laugh, Messieurs les Vivisecteurs, if you please—that I could not bear the sight. . . . It is true that Dr. P. H. Bérard, Professor of Physiology, never performed a single vivisection in his lectures, which were brilliant, elegant, and animated. But Bérard was an example of a singular psychological phenomenon. Toward the close of his life, so painful to him was the sight of blood and the exhibition of pain, that he gave up the practice of surgery, and would never allow his students to witness a vivisection. But Bérard was attacked by cerebral hæmorrhage, and the whole tone of his character was thereby afterward changed. The benevolent man became aggressive; the tolerant man, irritable. . . . He became an experimenter, and passed whole days in practising vivisections, *taking pleasure in the cries, the blood, and the tortures of the poor animals.'*"

The following week the *Journal* again refers to the subject, the "*atrocities of vivisection.*" It is a noteworthy phrase, proceeding from a medical journal, and

should not be forgotten. Concerning the truth of the charges, the absolute heartlessness exhibited, there can be no possible doubt, for the evidence is cumulative. Has the phrase " atrocities of vivisection " appeared in the editorial columns of any medical journal during the past twenty years, unless in the way of ridicule or contempt ? It may be doubted.

" The atrocities of vivisection continue to occupy the attention of the Paris papers. The *Opinion Nationale* says: ' The poor brutes' cries of pain sadden the wards of the clinic, rendering the sojourn there insupportable both to patients and nurses. Only imagine that, when a dog has not been killed at one sitting, and that enough life remains in him to experiment upon him in the following one, they put him back in the kennel, all throbbing and palpitating ! There the unhappy creatures, already torn by the scalpel, howl until the next day, in tones rendered hoarse and faint by another operation intended to deprive them of voice.' "

Again, only three weeks later, in its issue of September 19, 1863, the *British Medical Journal* presents in an editorial an account of the debate on Vivisection in the French Academy of Medicine. It is of interest, not only as an indication of English opinion at that day, but also as evidence of what was being done by vivisectors over fifteen years after the discovery of chloroform.

" Our readers are aware that the French Minister of Commerce submitted to the Academy of Medicine documents supplied to him by a London society. . . . A committee of the Academy examined these questions and issued a report, but they did not answer the simple questions put to it. A discussion on the report has naturally taken place in the Academy itself, and has given rise to some very interesting remarks. M. Dubois . . . refused to draw up the report because he differed somewhat in opinion on the subject of vivisections from many of his associates. He therefore reserved the liberty of speaking his mind

freely on the subject before the Academy. His conclusions are well worthy serious attention. They seem to us to contain all that can be rightly said in favour of vivisection, and to put the matter on its true and proper footing. The greatest praise is due to M. Dubois for having had the courage to express his opinion so boldly and openly. . . .

"In the first part of his speech, M. Dubois demolished the work of the report, showing that it did not answer the questions of the Government, and left things exactly in their previous state. He then proceeded to give his opinion as to what reforms should be made in the practice of vivisection. The greatest physiologists, he remarked, such as Harvey, Asselli, Haller, were parsimonious and discreet in their use of vivisection. To-day we have before our eyes a very different spectacle. Under pretence of experimentally demonstrating physiology, the professor no longer ascends the rostrum; he places himself before a vivisecting-table, has live animals brought to him, and experiments. The habitual spectators at the *School of Medicine*, the *College of France*, and the *Faculty of Sciences*, know how experiments are made on the living flesh, how muscles are divided and cut, the nerves wrenched or dilacerated, the bones broken or methodically opened with gouge, mallet, saw, and pincers. Among other tortures there is that horrible one of the opening of the vertebral canal or of the spinal column to lay bare membranes and the substance of the marrow; *it is the sublime of horror*. One needs to have witnessed that sight thoroughly to comprehend the real sense of the word 'vivisection.' Whoever has not seen an animal under experiment *cannot form an idea of the habitual practices of the vivisectors*. M. Dubois drew an eloquent picture of these practices, become usual in the physiological amphitheatres in the midst of blood and of howls of pain, and he showed that under the dominant influence of the vivisectors, physiological instruction has gone out of its natural road. Himself an eminent pathologist, he treated without ceremony the unjustifiable pretensions of those innovators, who, regardless at once of the principles of physiology and those of pathology, try to transport clinical surgery to the table of vivisection.

"M. Dubois, indeed, was so pungent in his censures that some of the Academicians left the hall without awaiting the end of his discourse. The veterinary part of his audience heard him to the end, and, it is to be hoped, profited by the picture he

drew of the sight that met his eyes on his first visit to Alfort. M. Renault, the director of the establishment, took M. Dubois into a vast hall, where five or six horses were thrown down, each one surrounded by a group of pupils, either operating or waiting their turn to do so. Each group was of eight students, and matters were so arranged that each student could perform eight operations, so well graduated that, although the sixty-four operations lasted ten hours, a horse could endure them all before being put to death. Although unwilling to hurt the feelings of his host, M. Dubois could not help letting slip the word '*atrocity.*' 'Atrocities, if you please,' replied M. Renault, 'but they are necessary.' 'What!' exclaimed M. Dubois; '*sixty-four operations, and ten hours of suffering?*' M. Renault explained to him that this was a question of finance; that if more money were allowed, the horses might be kept only three or four hours under the knife. M. Dubois stated that it was true fewer operations are now performed, and that horses are kept less time under the hands of experimenting students. But, he declared, he should never forget the sight he witnessed at Alfort. Some of the horses were just begun upon; others were already horribly mutilated; they did not cry out, but gave utterance to hollow moans. M. Dubois, supported by the authority of many veterinary surgeons, demands that these practices should be discontinued. Dr. Parchappe, who spoke afterward, agreed with M. Dubois. He said: '. . . Experiments on animals are in no way indispensable to completely efficacious instruction in physiology.'"

It could hardly have been expected by anyone save the most sanguine of mortals that the French Academy of Medicine would agree to censure or condemn certain of its own members at the instance of English humanitarians, even though supported by men of their own nationality. When the matter came to a vote, the opponents of change passed a resolution declaring that complaints had no basis, and that the question of performing experiments or surgical operations in the veterinary schools "*should be left to the discretion of men,*

of science." This is precisely the position taken to-day both in England and America by those who contend that the practice should not be restricted by law. The *Journal*, however, adds:

"Everyone who has followed this debate must be aware that the resolution is . . . entirely opposed to the facts elicited in the discussion. Almost every speaker, except the veterinaries, put in a protest more or less strong against the practice of surgical operations in veterinary schools, and again and again was the word *atrocious* applied to them. We learn, moreover, that this mode of instruction was adopted in 1761, so that for more than a century these atrocious operations have been practiced on animals in French veterinary schools. Yet the Academy decides that complaints on this score are without foundation, and that men of science in this matter *need no interference!* We may be sure that, however much the Academicians may snub the affair, the discussion cannot fail to have beneficial results."

Two or three weeks later, on October 10, the *Journal* again touches the subject of physiological demonstrations, and denounces them—when conducted as in Paris—as a scandal to humanity. The *Journal* says:

"M. Dubois has published a discourse . . . on the subject of vivisection in answer to objections made to the amendments proposed by him. It is a brilliant summary of the whole subject, and utterly condemnative of the amendments carried by the Academy. M. Dubois showed to demonstration that . . . physiological demonstrations on living animals in the public [Medical] schools *are utterly unjustifiable, and a scandal to humanity. In all this we most thoroughly agree with him.* He said:

"'If we are to carry out the wishes of certain *savants*, we shall make everyone of our professional chairs a scene of blood. . . . Let us tell the Minister that vivisections are necessary for the advancement of science, and that to suppress them would be to arrest the progress of physiology; but let us also say that *they are unnecessary in the teaching of this science, and that recourse ought not to be had to them, either in public or private lectures.*'"

Under what restrictions would the *British Medical Journal* of that day permit animal experimentation?

In two editorial utterances the *Journal* briefly defines its position. In the issue of January 16, 1864, we have the following expression of its views:

"The conditions under which—and under which alone—vivisections may be justifiably performed seem to us to be clear and easily stated. . . . We would say, then, in the first place, that those experiments on living animals, and those alone, are justifiable which are performed for the purpose of elucidating obscure or unknown questions in physiology or pathology; that whenever any physiological or pathological fact has been distinctly and satisfactorily cleared up and settled, all further repetition of the experiments which were originally performed for its demonstration are unjustifiable; that they are needless torture inflicted on animals, being, in fact, performed not for the purpose of eliciting unknown facts, *but to satisfy man's curiosity*. . . .

"And in the second place, we would say that only those persons are justified in experimenting upon living animals who are capable experimentalists. . . . All experiments made by inexperienced and incapable observers are unjustifiable, and for an obvious reason. The pain in such case, suffered by the animal, is suffered in vain. . . . Pain so inflicted is manifest *cruelty*."

If we compare this statement with any recent expression of the *Journal's* views, we shall see how far this organ of medical opinion has strayed in fifty years from the conservatism of Sir Charles Bell toward the unrestricted freedom demanded by the apologists of Magendie and Brachet. Six months later, another pronouncement appears in its editorial columns. In the issue of June 11, 1864, we read:

"Far be it from us to patronize or palliate the infamous practices, the unjustifiable practices, committed in French veterinary schools, and in many French Medical schools, in the matter of

vivisection. We repudiate as brutal and cruel all surgical operations performed on living animals. *We repudiate the repetition of all experiments on animals for the demonstration of any already well-determined physiological question.* We hold that no man except a skilled anatomist and a well-informed physiologist has a right to perform experiments on animals."

It is unnecessary to state that these excerpts from the editorial columns of medical journals are not quoted by way of criticism. On the contrary, they seem in the highest degree creditable to the medical periodicals in which they appeared. They voiced a condemnation of scientific cruelty which then found a universal response. In the awakening of public apprehension regarding the growing abuses incident to vivisection, their influence cannot be too highly esteemed. There can be no question that these exposures of physiological methods, these repeated and emphatic denunciations of cruelty, proceeding from the leading medical journals of England, contributed more than anything else to arouse the general public to the acknowledged existence of abuse, and to the necessity of some legislation regarding the vivisection of animals. *And yet no advocate of unrestricted vivisection in our day ever refers to them.* Sir William Osler tells the Royal Commission that "it is news to him." Professor Bowditch, the leading physiologist of Harvard Medical School, refers with contempt to "blood-curdling stories" in the pamphlet of Dr. Fleming as the "first serious attack" upon vivisection—without the slightest reference to all this earlier criticism, this exposure of infamous cruelty by the leading journals of the medical profession! But the worst and most regrettable result of such ignorance on the part of those who teach is its effect upon those

who, as students, follow their guidance, accept their prejudices, and, unconscious of their ignorance, give to their statements implicit trust.

We shall perhaps be told that although the facts are as stated, yet these medical condemnations of cruelty are the outgrown opinions of the Past. Are the foundations of morals so unstable ? Can lapse of years transmute cruelty into benevolence and righteousness ? Are we now to be asked to approve the conduct of Magendie and of Mantegazza and Bérnard, and send to the lumber room of " past opinions " the expressions of horror and repulsion which their acts once excited throughout the English-speaking world ? The science of the modern school of physiologists gives that implication: " *Let all that pass*," is their cry to-day. With this we cannot for a moment agree. Rather let us believe that in the whirl and conflict of opinions that marks the social evolution of Humanity, there are some principles which are stable and some landmarks that cannot be altered. Cruelty is a vice that should never be condoned. What was regarded as infamous in the laboratory of fifty years ago should be considered equally infamous to-day.

CHAPTER VIII

THE ATTAINMENT OF LEGAL REGULATION

THE awakening of a nation to the existence of a great evil is only accomplished after years of persistent agitation. We have seen that some of the strongest denunciations of cruelty in biological experimentation were due to that large element in the medical profession which refused to condone cruelty under the guise of utility. Gradually public opinion began to be thoroughly aroused. In the year 1864 the Royal Society for the Prevention of Cruelty to Animals offered a prize for the best essay on these questions :

"Is vivisection necessary or justifiable for purposes of giving dexterity to the operator (as in veterinary schools) ?

"Is it necessary or justifiable for the general purposes of science, and, if so, under what limitations ?"

The committee which decided the merits of the essays submitted included some of the most distinguished scientists of England, among them Professor Owen (better known as Sir Richard Owen), and Professor Carpenter, physiologists of eminence and experience. The first prize was accorded to Dr. George Fleming, the leading veterinary authority in Great Britain for many years, and a second prize was given to Dr. W. O. Markham, F.R.C.P., one of the physicians to St. Mary's

Hospital of London, and formerly lecturer on Physiology at St. Mary's Hospital Medical School.

Dr. Fleming's essay was undoubtedly of great utility in calling attention to the abuses pertaining to Continental physiological teaching. That which makes his essay of chief value is not so much the presentation of arguments, as the long array of unquestionable facts for which the authorities are given. There is hardly a physiological writer of distinction from whose works he did not quote to illustrate the excesses he condemns.

It is Dr. Markham's essay, however, which for us, at the present moment, has principal significance. It is the argument of a professional physiologist, defending the right of scientific research within limits which then seemed just and right to the entire medical profession of the United Kingdom. Every physiologist or physician upon that committee which examined the essays is said to have marked with approval this presentation of their views; and Professor Owen—probably then the most distinguished man of science in Great Britain—appended a note significant of his especial agreement. And yet Dr. Markham's essay is never quoted at present by any advocate of free vivisection; even Professor Bowditch in that address to which reference has been made left unmentioned the work of his professional brother, one of the earliest defenders of animal experimentation.

The reader of Dr. Markham's essay will not find it difficult to comprehend the cause of this significant silence. Although the essay was in no way sympathetic with antivivisection, it represented the Anglo-Saxon ideal, in marked distinction from the doctrines which then prevailed in the laboratories of Continental Europe,

and which since have become dominant throughout the United States. Defending the practice of vivisection as a scientific method, Dr. Markham freely admitted the prevalence of abuses to which it was liable when carried on without regulation or restraint. Under proper limitations it was at present necessary that some vivisection should be allowed; but with the advance of knowledge, he believed that this necessity would decrease, and the practice of animal experimentation gradually tend to disappear. Some quotations from this essay will be of interest.

"The proper and only object of all justifiable experiments on animals is to determine unknown facts in physiology, pathology, and therapeutics, whereby medical science may be directly or indirectly advanced. When, therefore, any fact of this kind has been once determined and positively acquired to science, all repetition of experiments for its further demonstration are unnecessary, and therefore unjustifiable.

"All experiments, therefore, performed before students, in classes or otherwise, for the purpose of demonstrating known facts in physiology or therapeutics, are unjustifiable. And they are especially unjustifiable because they are performed before those who, being mere students, are incapable of fully comprehending their value and meaning. *They are needless and cruel:* needless, because they demonstrate what is already acquired to science; and especially cruel, because if admitted as a recognized part of students' instruction, *their constant and continued repetition, through all time, would be required.* I need hardly say that courses of experimental physiology are nowhere given in this country, and that these remarks apply only to those schools in France and elsewhere where demonstrations of this kind are delivered."[1]

"*Especially cruel!*" Little could Dr. Markham have imagined that this "especial cruelty" which he thus so

[1] "Experiments and Surgical Operations on Living Animals: One of Two Prize Essays." London: Robert Hardwick, 1866.

emphatically denounced in 1864 would spread from the Continent of Europe and become, within the short space of a single generation, the accepted method of physiological instruction in every leading college or university in the United States!

Dr. Markham evidently fancied that with the larger acquirement of facts the vivisection method would gradually become obsolete. He says:

"A consideration of the conditions here proposed as requisite for the rightful performance of experiments on living animals shows that experiments of this kind must ever be very limited, because those persons who are fitted for the due performance of them are of necessity few in number; and that in proportion as new facts are added by them to our knowledge, *the experiments must diminish in number. . . .*"

"Thus, then, we have seen that in the case of experiments legitimately performed on living animals, . . . such experiments must always, from their nature, be comparatively few; that they must gradually diminish with the advance of scientific knowledge, so that *a time may come when experiments on living animals will cease to be justifiable.*

". . . Very different, on the other hand, is the character and objects of physiological demonstrations performed in French Schools of Medicine. . . . These most painful practices are unjustifiable because they are unnecessary. . . . They afford no instruction to the student which may not be equally well obtained in another way. The pain, moreover, attendant on such proceedings is unlimited and unceasing. If they are to be accepted as a necessary part of the systematic instruction of the student, then must every veterinary student practice these experimental surgical operations, *and every medical student be made a witness of physiological demonstrations on living animals.* In all veterinary schools, under such conditions, an incalculable amount of pain inflicted on animals becomes a part of the regular instruction of students. At such a conclusion Humanity revolts.

"Experiments performed on living animals for the demonstration of facts already positively acquired to science are un-

justifiable, and especially unjustifiable are such experiments when made a part of a systematic course of instruction given to students."

Here, then, we have a view of vivisection presented less than forty years since by a professional teacher of physiology in a London medical school. That the author was mistaken in his outlook, that the practice of vivisection instead of diminishing has a thousand times increased, and that operations then regarded as " especially cruel " have become the prevalent methods of instruction, are matters evident to all. Peculiarly significant is the fact that a creed, once almost universally held, may be so thoroughly obliterated by its antagonists within so brief a time. One may safely assert that not a single recent graduate from any Medical College in America, not a single student of physiology in any institution of learning in our land to-day, has ever been told that the practice of animal experimentation was once thus regarded by a large majority of the English-speaking members of the medical profession. So completely has the Continental view of the moral irresponsibility of science established itself in American colleges that the former preponderance of other ideals has passed from the memory of the present generation of scientific men.

The subject of vivisection does not again appear to have engaged the attention of the English medical Press for several years. The abuses and cruelties on the Continent, against which it had so vigorously protested, continued as before. In a brief editorial, the London *Lancet*, on April 3, 1869, again referred to the subject:

"VIVISECTION.—The subject of vivisection has been again brought on the *tapis*, owing to some remarks made by Professor (Claude) Bérnard . . . at the Collège de France. . . . He admits on one occasion having operated on an ape, but never repeated the experiment, *the cries and gestures of the animal too closely resembling those of a man.*

"As the *Pall Mall Gazette* remarks, M. (Claude) Bérnard expatiates on the subject with a complacency which reminds us of Peter the Great, who, wishing, while at Stockholm, to see the *wheel* in action, quietly offered one of his suite as the patient to be broken on it. . . .

"We consider that vivisection constitutes a legitimate mode of inquiry when it is adopted to obtain a satisfactory solution of a question that has been fairly discussed, and can be solved by no other means. . . .

"We hold that for mere purposes of curiosity, *or to exhibit to a class* what may be rendered equally—if not more—intelligible by diagrams or may be ascertained by anatomical investigation or induction, *vivisection is wholly indefensible,* and *is alike alien to the feelings and humanity of the Christian, the gentleman, and the physician.*"

It is very probable that much of the criticism of foreign vivisection, which at this period appeared in the medical journals of England, was inspired by the abhorrence felt regarding the cruelty of certain French physiologists. We now know that the worst and most cruel of them all was Claude Bérnard, Professor of Experimental Physiology at the Collège de France, and the fit successor of Magendie. Just as pirates and freebooters have added to geographical discoveries, so science admits that regarding the functions of certain organs he added to accumulated facts. But the peculiar infamy of Bérnard was the indifference displayed toward animal suffering long after the discovery of chloroform and ether, and his practical contempt for any sentiment of compassion for vivi-

sected animals. Of this savagery one will look in vain for criticism or condemnation in the writings of the opponents of vivisection reform at the present day. Two physicians, however, have told us what they witnessed in the laboratory of Bérnard. On February 2, 1875, there appeared in the *Morning Post* a letter from a London physician, describing his personal experience in the laboratory of this physiologist.

"SIR,

"If the Society for the Prevention of Cruelty to Animals intends to give effect to the memorial presented to it on Monday, and do its utmost to put down the monstrous abuses which have sprung up of late years in the practice of vivisection, it will probably find that the greatest obstacle to success lies *in the secrecy with which such experiments are conducted, and it is to the destruction of that secrecy* that its best efforts should be directed. So long as the present privacy be maintained, it will be found impossible to convict, for the want of evidence. No student can be expected to come forward as a witness when he knows that he would be hooted from among his fellows for doing so, and any rising medical man would only achieve professional ruin by following a similar course. The result is that, although hundreds of such abuses are being constantly perpetrated among us, the public knows no more about them than what the distant echo reflected from some handbook for the laboratory affords. I venture to record a little of my own experience in the matter, part of which was gained as an assistant in the laboratory of one of the greatest living experimental physiologists.

"In that laboratory we sacrificed daily from one to three dogs, besides rabbits and other animals, and after four months' experience I am of opinion that not one of those experiments on animals was justified or necessary. The idea of the good of Humanity was simply out of the question, and would have been laughed at; *the great aim being to keep up with, or get ahead of, one's contemporaries in science,* even at the price of incalculable amount of torture needlessly and iniquitously inflicted on the poor animals. During three campaigns I have witnessed many harsh sights, but I think the saddest sight I ever witnessed was when the dogs

were brought up from the cellar to the laboratory for sacrifice. Instead of appearing pleased with the change from darkness to light, they seemed seized with horror as soon as they smelt the air of the place, divining, apparently, their approaching fate. They would make friendly advances to each of three or four persons present, and as far as eyes, ears, and tail could make a mute appeal for mercy eloquent, they tried it in vain. Even when roughly grasped and thrown on the torture-trough, a low complaining whine at such treatment would be all the protest made, and they would continue to lick the hand which bound them, till their mouths were fixed in the gag, and they could only flap their tails in the trough as the last means of exciting compassion. Often when convulsed by the pain of their torture this would be renewed, and they would be soothed instantly on receiving a few gentle pats. It was all the aid and comfort I could give them, and I gave it often. They seemed to take it as an earnest of fellow-feeling that would cause their torture to come to an end—an end only brought by death.

"Were the feelings of experimental physiologists not blunted, they could not long continue the practice of vivisection. They are always ready to repudiate any implied want of tender feeling, but I must say that they seldom show much pity; on the contrary, in practice they frequently show the reverse. Hundreds of times I have seen, when an animal writhed with pain and thereby deranged the tissues during a delicate dissection, instead of being soothed, it would receive a slap and an angry order to be quiet and behave itself. At other times, when an animal had endured great pain for hours without struggling or giving more than an occasional low whine, instead of letting the poor mangled wretch loose to crawl painfully about the place in reserve for another day's torture, it would receive pity so far that it would be said to have behaved well enough to merit death, and as a reward would be killed at once by breaking up the medulla with a needle, or 'pithing,' as this operation is called. I have often heard the professor say, when one side of an animal had been so mangled and the tissues so obscured by clotted blood that it was difficult to find the part searched for, 'Why don't you begin on the other side?' or '*Why don't you take another dog? What is the use of being so economical?*' One of the most revolting features in the laboratory was the custom of giving an animal, on which the professor had completed his experiment, and which

had still some life left, to the assistants to practise the finding of arteries, nerves, etc., in the living animal, or for performing what are called 'fundamental experiments' upon it—in other words, repeating those which are recommended in the laboratory handbooks.

"I am inclined to look upon anæsthetics as the greatest curse to vivisectible animals. They alter too much the normal conditions of life to give accurate results, and they are therefore little depended upon. *They, indeed, prove far more efficacious in lulling public feeling towards the vivisectors than pain in the vivisected.* Connected with this there is a horrible proceeding that the public probably knows little about. An animal is sometimes kept quiet by the administration of a poison called 'curare,' which paralyzes voluntary motion while it heightens sensation, the animal being kept alive by means of artificial respiration.

"I hope that we shall soon have a Government inquiry into the subject, in which experimental physiologists shall be only witnesses, not judges. *Let all private vivisection be made criminal, and all experiments be placed under Government inspection,* and we may have the same clearing away of abuses that the Anatomy Act caused in similar circumstances.

"I am, sir, your obedient servant,

"GEORGE HOGGAN, M.B. AND C.M.

"13, *Granville Place, Portman Square, W.*"

One of the oldest members of the medical profession in Massachusetts has also written of his experience in Bérnard's laboratory, and his account of the cruelty there practised entirely accords with that of the English physician:

"When I was studying medicine in Paris, it was the custom of a distinguished physiologist to illustrate his lectures by operations on dogs. Some of his dissections were not very painful, but others were attended with excruciating, long-continued agony; and when the piteous cries of these poor brutes would interrupt his remarks, with a look of suppressed indignation, he would artistically slit their windpipes, and thus prevent their howling! Curiosity prompted me to inquire of the janitor

whether, after this period of torment, these creatures were mercifully put out of misery; and I ascertained that such animals as did not succumb to the immediate effects of their mutilations were consigned to a cellar, to be kept, unattended and unfed, until wanted for the following lectures, which occurred on alternate days. I never noticed the slightest demonstration of sympathy on their behalf, except on the part of a few American students. These dogs were subjected to needless torture, for the mere purpose of illustrating well-known and accepted facts, capable of being taught satisfactorily by drawings, charts, and models; and hence this cruelty, being unattended by any possible benefit to either students or mankind, was illegitimate and unjustifiable. But when it is considered that these same experiments might have been conducted under the influence of an anæsthetic, so as to minimize, if not remove, this needless suffering, this cold-blooded, heartless torture can only be characterized as contemptible and monstrous.

"From detailed accounts communicated to me by eye-witnesses of the incidents related, I entertain no doubt that barbarous cruelty was practised at that time in all the Parisian laboratories, though it is probable that, for novel and horrible experiments, none could rival the infernal ingenuity in this business of that master-demon, Claude Bérnard."[1]

Such is the memory which Bérnard has left for posterity. It was by useless cruelty that he impressed. And no American physiologist, sounding the praises of free and unrestricted vivisection, has ever yet ventured to criticize or to condemn either the man or his work.

Let us go back a little. By the year 1871, the agitation had gone so far as to be deemed worthy of consideration by the leading scientific body in Great Britain. At the meeting of the British Association in Liverpool of that year, a committee was appointed to consider the subject of animal experimentation, and the result of their

[1] Extracts from letter to *Boston Medical and Surgical Journal*, April, 1895.

deliberations appears in the annual report. Regarding the practice, they suggest four recommendations or rules:

"1. No experiment which can be done under the influence of an anæsthetic ought to be done without it.

"2. No painful experiment is justifiable for the mere purpose of illustrating a law or fact already determined; in other words, experimentation without the employment of anæsthetics is not a fitting exhibition for teaching purposes."

A third rule suggested that painful experiments should only be made in laboratories under proper regulation; and a fourth rule condemned veterinary operations for the purpose of obtaining manual dexterity. It was evidently an attempt to allay agitation—there were no means of enforcing the recommendations concerning practices which the law did not touch.

One of the signers was Dr. Burdon Sanderson, a Lecturer on Physiology. Early the following year he began the delivery of a course of lectures in the physiological laboratory of University College in London, illustrated by vivisections. During one of these discourses, the lecturer made the following statement of his views:

"With respect to what are called 'vivisections,' I assure you that I have as great a horror of them as any member of the Society for the Prevention of Cruelty to Animals. The rules in respect to them are these: First, no experiment that can be done under the influence of an anæsthetic ought to be done without it. Secondly, no *painful* experiment is justifiable for the mere purpose of illustrating a law or fact already demonstrated. Thirdly, whenever for the investigation of new truth, it is necessary to make a painful experiment, every effort should be made to insure success, in order that the suffering inflicted may not be wasted. For the question of cruelty depends not on the amount of suffering, but on its relation to the good to be attained by it."[1]

[1] *Medical Times and Gazette*, February 25, 1871.

The lecturer contended that no experiment should be performed by an unskilled person with insufficient instruments, and argued, therefore, in favour of the establishment of Physiological Laboratories, equipped with all modern devices and instruments for vivisection.

Some of his demonstrations were doubtless unproductive of pain, but in view of the fact that in other experiments no anæsthetic was employed, it may be questioned whether his second " rule " was always very strictly observed. In one lecture he referred to his demonstration " as the first time that we have applied electrical stimulus to a nerve," and explains that when the experiment is made on an animal paralyzed with *curare*, the effect is more complicated when a sensory nerve is irritated, since then " the arteries all over the body contract, because the brain is in action." [1] No plainer confession of the existence of sensibility could be made, yet for obvious reasons the lecturer carefully avoids admitting the presence of pain. During the following year there appeared articles describing " the teaching of practical physiology in the London schools." At King's College in London, for example, demonstrations were made by the lecturer, but " experiments on animals are never given to the ordinary student to do; Professor Rutherford's experience on this point is that such attempts result only in total failure." [2] On the other hand, at University College, the Continental method of teaching was to be found. " Students perform experiments on animals. Frogs, *curarized* or chloroformed, are given them,

[1] *Medical Times and Gazette*, June 17, 1871.
[2] *Ibid.*, July 20, 1872.

and the experiment which has been fully explained and demonstrated by the professor, is performed by them as far as practicable."[1] Here, then, we find introduced into England (and perhaps there existing in secret for some time before), that vivisection of animals in illustration of well-known facts, which, but a few years earlier, every leading medical journal of Great Britain had so emphatically reprobated and denounced.

The Continental school of English physiologists seemed confident of victory. But the leading exponents of English ideals in medicine were not inclined to surrender at once; now and then we find them vigorously maintaining their ground, and disposed to contrast the science gained in the laboratory with that gathered by experience and fortified by reflection. Some extracts from a leading editorial in the *Medical Times and Gazette* are extremely suggestive of the conflict of opinions:

"The relation of physiology to practical medicine is a subject which has been brought prominently into notice by the address of Dr. Burdon Sanderson . . . at the recent meeting of the British Association. That address may be considered as the first authoritative and public announcement made in this country that *it is the aim and intention of the Physiological school of thought* and work to separate themselves more and more from the school of practical medicine; no longer to consider themselves auxiliary to it except as other sciences—for instance, chemistry and botany—may be considered auxiliary to it, but to win a place in public estimation for their science as one which shall be cultivated *for its own sake*. . . .

"The teaching of experience is more reliable than physiological theories and opinions. . . . The history of the advance

[1] *Medical Times and Gazette*, July 27, 1872.

of the cure of disease is the history of empiricism, in the best sense of that much-abused word. The history of retrogression in the art of curing disease is that of so-called Physiological Schools of Medicine. . . . Physiological theory, based on experiments on dogs, wishes us to believe that mercury does not excite a flow of bile; but here the common sense of the Profession, educated by experience, has refused to be led by physiological theory. . . . Modern physiological science has taught us little more than the necessity of pure air, water, and food, good clothing and shelter, moderation in eating and drinking, and regulation of the passions—things, in fact, which are as old as the Pentateuch. If we go beyond these, we get into the domain of practical medicine. We may safely assert that all the experiments made on luckless animals since the time of Magendie to the present, in France, America, Germany, and England, have not prolonged one tithe of human life, or diminished one tithe of the human suffering that have been prolonged and diminished by the discovery and use of Jesuits' bark and cod-liver oil."[1]

Early the next year (1873) was published the "Handbook of the Physiological Laboratory," compiled by leading men of the physiological party, among whom were Professors Sanderson, Foster, and Klein. Describing the method of performing various experiments upon animals, it included a particular account of some of the most excruciatingly painful of the vivisections practised abroad. So atrocious was one of the experiments thus described in this handbook for students that Professor Michael Foster, who wrote the description, afterward confessed that he had never seen or performed the experiment himself, partly "from horror of the pain." Reviewing the work, a medical journal justly declared that "the publication of this book marks an era in the history of physiology in England. . . . It shows *the predominant influence which Germany now*

[1] *Medical Times and Gazette* (Editorial), September 7, 1872.

exercises in this department of science."[1] A professor of physiology, Dr. Gamgee, about the same time, refers to the physiological laboratories of Edinburgh, Cambridge, and London, and the part they sustained "in what I may call the Revival of the study of experimental physiology in England."[2]

Emboldened by continuing success, the advocates of Continental vivisection in England determined to advance yet another step. The annual meeting of the British Medical Association for 1874 was to be held that year in August in the city of Norwich. A French vivisector, Dr. Magnan, was invited to be present, and to perform in the presence of English medical men certain experiments upon dogs. On this occasion, however, the public demonstration of French methods of vivisection did not pass without protest; there was a scene; some of the physicians present—among them Dr. Tufnell, the President of the Royal College of Surgeons of Ireland, and Dr. Haughton of the medical school in Dublin, denounced the experiments at the time they were made as unjustifiably cruel. Public attention was beginning to be aroused; it was decided to test the question, whether such exhibitions were protected by English law, and a prosecution was instituted against some who had assisted in performing the experiments. Dr. Tufnell appeared to testify in regard to the cruelty of the exhibition, and Sir William Fergusson, surgeon to the Queen, who had only just retired from the presidency of the British Medical Association, not only stigmatized one of the experiments as "an act of

[1] *Medical Times and Gazette*, London, March 29, 1873.
[2] *Ibid.*, October 18, 1873.

cruelty," but declared that "such experiments would not be of the smallest possible benefit."[1] The magistrates decided that while the case was a very proper one to prosecute, yet the gentlemen named as defendants were not sufficiently proven to have taken part in the experiment. The decision was not unjust; the real offender was safe in his native land.

It is not my purpose to trace the course of the English agitation against vivisection, except as it may be seen in the medical literature of the time; but one cannot refer to this period without mention of the name of Frances Power Cobbe. In 1863, while in Italy, she had protested, and not in vain, against the cruelties of Professor Schiff in Florence. Taking up the question again in 1874, she devoted the remainder of her life to the advancement of her ideals of reform. It was to her zeal that in 1875 was founded the "Society for the Protection of Animals liable to Vivisection." At this period, then, three phases of opinion opposed one another; first, the antivivisectionists, who desired the total suppression by law of all animal experimentation; second, the physiological enthusiasts, few in number, but favourable to the introduction of the Continental irresponsibility, and eager to free vivisection from every semblance of restraint; and, thirdly, the great body of Englishmen and of the medical profession, whose views we have seen reflected in medical journals of the day. The popular attack upon all animal experimentation became so pressing that for a time the entire medical profession seemed to unite in its defence; and editorial space once filled with denunciation of vivisection in

[1] *British Medical Journal*, December 12, 1874.

France was now given over to criticism of the anti-vivisectionists of England. Yet, even at this period, there appeared no repudiation of those humane principles, so long professed by English medical men. One leading journal, the *Medical Times and Gazette*, thus suggests that very oversight of vivisection which we are told is impossible:

"Just as the law demands that a teacher of anatomy should take out a licence, and be responsible for the bodies entrusted to him, so a teacher of physiology might be required to take out some such licence as regards the teaching of practical physiology. We have never been of those who advocate the wholesale performance of experiments by students, especially on the higher animals, if they are of such a kind as to require any degree of skill for their performance. When the medical public seemed bitten with what was called 'practical physiology,' many were ready to advocate the performance of all kinds of experiments on living animals by uninstructed students. Against this notion we were first to protest, as being at once cruel and worse than useless; for an experiment performed by bungling fingers is no experiment at all, but wanton cruelty."

After explaining his position in favour of scientific research, the editor refers to a recent discussion on vivisection in London:

"Dr. Walker declared that his desire was not to stop scientific research, but the abuses which were connected with it. In the first place, he would not allow vivisection to be practised by incompetent students. This was nothing but wanton and unrighteous cruelty. *Therefore he would oblige each vivisector to obtain legal permission from competent authority.* Another abuse related to operations performed merely to demonstrate physiological phenomena already verified and established. Again, the number of animals vivisected was shamefully high. Persons unacquainted with physiological laboratories could form no idea of the lavish way in which animals were made to suffer days and weeks of anguish and acute pain. If the people knew of these sufferings, they would insist that the number of animals annually

vivisected should be limited, and that no animal rearing its young should be experimented upon. Nor should it be allowable to operate on an animal more than once. . . . Lastly, every licensed vivisector should be obliged to send in an annual return, showing the number of vivisections performed, and the scientific results attained, which would prevent repeated operations with the same object. Nothing in any of these proposals, urged Dr. Walker, could interfere with the progress of science; they would simply stop the abuses which existed."[1]

In January, 1875, we find the London *Lancet* also suggesting legal supervision and restriction:

"We are utterly opposed to all repetition of experiments for the purpose of demonstrating established doctrines. . . . We believe an attempt might be made to institute something in the way of regulation and supervision. *It would not be difficult, for example, to impose such restrictions on the practice of these experiments* as would effectually guard against their being undertaken by any but skilled persons, for adequate scientific objects."[2]

A month later the *Lancet* devotes its leading editorial to a discussion of the ethics of vivisection. After criticizing the position taken by the antivivisectionists, the writer says:

"On the other side, the discussion has been conducted as if it concerned physiologists alone, who were to be a law unto themselves, and each to do what might seem right in his own eyes; that the matter was one into which outsiders had no right whatever to intrude; in fact, that '*whatever is, is right,*' and so unquestionably right as to stand in no need of investigation or restriction. We have, from the first, striven to take a middle course, not because it was safe, but because it seemed to us the sound and true one. Without disguising the difficulties, we have nevertheless expressed our conviction that the subject was one about which it was impossible not to feel a sense of responsibility, and a desire to ascertain whether the line between necessary and

[1] *Medical Times and Gazette* (Editorial), June 27, 1874.

[2] The London *Lancet* (Editorial), January 2, 1875.

unnecessary could be defined; and whether any attempt could be made to institute something in the way of regulation, supervision, or restriction, so as to secure that, while the ends of science were not defeated, the broad principles of Humanity and duty to the lower animals were observed. Animals have their rights every bit as much as man has his. . . ."

Admitting the probable necessity of some repetition of experiments in research, the writer continues:

"It is for the purposes of instruction, however, that it becomes questionable whether and to what extent experiments of this kind should be performed. A chemical lecturer teaches well, in proportion to the clearness with which he can demonstrate the correctness of his statements by experiment, and there is no doubt it is the same with a Lecturer on Physiology. Some persons seem to regard the advance of knowledge as the whole duty of man, and they would perhaps consider experimentation as justifiable in the one case as in the other. We cannot so regard it, for the simple and sufficient reason (as it seems to us) that the element of Life and Sensibility being present in the one case and not in the other, carries a responsibility with it. We contend that in any case where certain phenomena are known to follow a given experiment, when the fact has been established by the separate and independent observation of many different persons, a lecturer is not justified in resorting to it *for the purpose of mere demonstration where its performance involves suffering to the animal.*" [1]

It is an instructive and interesting fact that one of the first steps toward the legal regulation of vivisection in England was taken by scientific men. The *Lancet* of May 8, 1875, contains the following paragraph:

"Some eminent naturalists and physiologists, including Mr. Charles Darwin, Professor Huxley, Dr. Sharpey, and others, have been in communication with Members of both Houses of Parliament to arrange terms of a Bill which would prevent any unnecessary cruelty or abuse in experiments made on living animals for purposes of scientific discovery. It is understood

[1] The London *Lancet*, February 6, 1875.

that these negotiations have been successful, and that the Bill is likely to be taken charge of by Lord Cardwell in the House of Lords, and by Dr. Lyon Playfair in the House of Commons."

A week later, the *Lancet* gives an outline of the proposed Act:

"The Bill introduced by Dr. Lyon Playfair, Mr. Spencer Walpole, and Mr. Evelyn Ashley, '*To Prevent Abuse and Cruelty in Experiments on Animals, made for the Purpose of Scientific Discovery,*' has been printed. It proposes to enact that painful experiments on living animals for scientific purposes shall be permissible on the following conditions:

"'That the animal shall first have been made insensible by the administration of anæsthetics or otherwise, during the whole course of such experiment; and that if the nature of the experiment be such as to seriously injure the animal, so as to cause it after-suffering, the animal shall be killed immediately on the termination of the experiment.

"'Experiments without the use of anæsthetics are also to be permissible provided the following conditions are complied with: That the experiment is made for the purpose of new scientific discovery and for no other purpose; and that insensibility cannot be produced without necessarily frustrating the object of the experiment; and that the animal should not be subject to any pain which is not necessary for the purpose of the experiment; and that the experiment be brought to an end as soon as practicable; and that if the nature of the experiment be such as to seriously injure the animal so as to cause it after-suffering, the animal shall be killed immediately on the termination of the experiment.

"'That a register of all experiments made without the use of anæsthetics shall be duly kept, and be returned in such form and at such times as one of Her Majesty's principal Secretaries of State may direct.

"'The Secretary of State is to be empowered to grant licences to persons provided with certificates signed by at least one of the following persons: the President of the Royal Society, the President of the Royal College of Surgeons or of the Colleges of Physicians in London, Edinburgh, or Dublin; and also by a recognized Professor of Physiology, Medicine, or Anatomy.'"[1]

[1] *Lancet*, May 15, 1875.

The Bill, though introduced in Parliament, was not pressed. Another and more stringent measure for the regulation of vivisection had been introduced a few days earlier through the efforts of Miss Frances Power Cobbe and the Earl of Shaftesbury. In the conflict of opposing statements and opinions, the Government wisely concluded that more light on the subject was necessary, and a Royal Commission was appointed to investigate and report.

But if the Continental party was to conquer in England, its members undoubtedly felt that it must be through audacity quite as much as by silence and secrecy. At the annual meeting of the British Medical Association, therefore, Professor William Rutherford delivered an address, wherein for the second time an English physiologist openly advocated the vivisection of animals as a method of teaching well-known facts. Commenting upon this address, the editor of the *Lancet* remarks:

"We confess that we think Dr. Rutherford presses his principle too far when he argues that, teaching by demonstration being the most successful method, we are thereby always warranted in having recourse to it. Physiology and chemistry are both experimental sciences. The chemical lecturer can have no hesitation in employing any number of experiments, or repeating them indefinitely to illustrate every step he takes; but we may fairly assume that the physiologist would be restrained by the thought that the materials with which he has to deal are not so much inert, lifeless matter, but sentient, living things. We hold, therefore, that it would be both unnecessary and cruel to demonstrate every physiological truth by experiment, or to repeat indefinitely the same experiment, simply because by such demonstrations the lecturer could make his teaching more definite, precise, and valuable." [1]

[1] The London *Lancet*, (Editorial) August 21, 1875.

Again, somewhat later the same journal brings into prominence one of the greatest difficulties attending all discussion of vivisection—the lack of agreement upon the meaning of words:

"It is extremely difficult to get at the exact meaning of the terms used. The physiologist would be ready to declare his utter abhorrence of all 'cruelty,' *but then he would have his own definition of the word.* We hope Sir William Thompson was not justified in stating that revolting cruelties are sometimes practised in this country, in the name of vivisection, although we may concur with him in reprehending the performance of experiments on animals in illustration of truths already ascertained. . . . When the Cardinal (Manning) laid it down as the expression of a great moral obligation that we had no right to inflict *needless* pain, he begged the whole question. By all means lay down and enforce any restriction that will prevent the infliction of *needless* pain."[1]

We see how valueless, therefore, is the assertion so frequently made in this country that "no *needless* pain is ever inflicted." The physiologist has his own interpretation of the word.

The testimony given before the Royal Commission was of the utmost value. Leading members of the medical profession, such as Sir Thomas Watson, physician to the Queen, and Sir William Fergusson, surgeon to the Queen, gave evidence against the unrestricted practice of animal experimentation. Physiologists after the Continental school stated their side of the controversy, usually with significant caution; but one of them, Dr. Emanuel Klein, with an honest frankness of confession that astounded his friends, made himself for ever famous in the history of the vivisection controversy. It is hardly accurate to say that no cruelty was uncovered

[1] The London *Lancet* (Editorial), March 25, 1876.

by the Royal Commission. Everything depends on the meaning of words, but the evidence of one of the most noted of English physiologists as to his own personal practices in vivisection was quite sufficient to justify the legislation that ensued. How seriously this evidence was regarded at the time is clearly shown in an extract from a confidential letter of Professor Huxley to Mr. Darwin, dated October 30, 1875:

"This Commission is playing the deuce with me. I have felt it my duty to act as counsel for Science, and was well satisfied with the way things are going. But on Thursday, when I was absent, —— was examined; and if what I hear is a correct account of the evidence he gave, I may as well throw up my brief. I am told he openly professed the most entire indifference to animal suffering, and he only gave anæsthetics to keep the animals quiet!

"I declare to you, I did not believe the man lived who was such an unmitigated, cynical brute as to profess and act upon such principles, and I would willingly agree to any law that would send him to the treadmill.

"The impression his evidence made on Cardwell and Foster is profound, and I am powerless (even if I desire, which I have not) to combat it."[1]

The result of the Commission's report was the introduction by the Government of a Bill placing animal experimentation in Great Britain under legal supervision and control. As first drawn up, it appears to have been regarded by the medical profession as unduly stringent and unfair. Protests were made, amendments

[1] Huxley's "Life and Letters," vol. i., p. 473. This characterization seems by no means fair, and probably it would have been so regarded by the writer in calmer moments. Is indignation chiefly directed to the "indifference to animal suffering," or to the "*open profession*" of the feeling? For men, perfectly familiar with Continental indifference, to condemn with holy horror a young physiologist because he "openly professes" the generally prevalent sentiment of his class, is very suggestive.

of certain of its provisions were requested, concessions were granted, and at the close of the Parliamentary session, August 15, 1876, the practice of vivisection, like the study of human anatomy by dissection, came under the supervision of English law.

It is curious to observe how those who had vehemently opposed the Act were able to approve it when once the law was in operation, and criticism could no longer serve any purpose of delay. The *British Medical Journal* of August 19, 1876, announcing to its readers the passage of the Bill, says:

"Taking the measure altogether, we think the profession may be congratulated on its having passed. . . . So far, the Act facilitates the prosecution of science by competent persons, while it protects animals from the cruelty which might be inflicted by ignorant and unskilful hands. *The act is a great step in advance toward promoting kindness to animals generally. . . .*"

The *Medical Times and Gazette* also regained its equanimity, and an editorial referring to the Act admits that "the profession may regard it without much dissatisfaction."[1] There are even advantages to be discerned:

"It gives scientific inquirers the protection of the law; it protects animals from cruelties which might be inflicted by unscientific and unskilled persons, and it satisfies to a great extent a demand made by a hypersensitive . . . portion of the public."

Nor did further experience with the working of the Act appear greatly to disturb this favourable impression. For instance, after the law had been in operation nearly three years, the London *Lancet* in its issue of July 19, 1879, editorially remarked:

[1] December 30, 1876.

"There is no reason to regret the Act of 1876 which limits vivisection, except on the ground that it places the interests of science at the arbitration of a lay authority. . . . *Meanwhile, the Act works well, and fulfils its purpose.*"

There can be no doubt, however, that the law has always been regarded with marked disfavour by the extreme vivisectionists of Great Britain. They had planned, as we can see, to introduce in the United Kingdom the freedom of vivisection which obtained on the Continent. They had failed, and instead of liberty to imitate Bérnard, Magendie, and Brown-Séquard, they saw between them and the absolute power they had craved and dreamed of obtaining, the majesty of English law. Among American representatives of the same school—the strenuous opponents of all legal supervision—it has been the fashion on every possible occasion to cast discredit upon this Act. For obvious reasons they have sought to represent it to the American public as having proven a serious detriment to medical science and an obstruction to medical advancement. The idea is absurd. English physicians and surgeons are as well educated and equipped in every respect as are the graduates of American schools. The complete refutation of all such misstatements regarding the effect of the English law will be found elsewhere. The Act is far from being an ideal law—it is capable of amendment in many respects—but it is an evidence of the acceptance by the English people of the principle of State regulation, and of their wish that between the will of the vivisector and the irresponsible and unlimited torment of the victim, there shall be some power capable, if it so desires, of making effective intervention.

CHAPTER IX

THE GREAT PROTESTANT AGAINST VIVISECTION CRUELTY

Among the critics of unlimited vivisection one American name of the present century stands pre-eminently above all others, not only for emphasis of denunciation, for vigour of condemnation, for clear distinctions between right and wrong, but also for the distinguished position which the writer held. Forty years ago in the medical profession of the United States no name stood higher than that of Dr. Henry J. Bigelow, the professor of surgery in Harvard University. To estimate the value of his criticism it is necessary to outline his career.

He was born in Boston, March 11, 1818, his father being Dr. Jacob Bigelow, one of the leading physicians of his day. After completing his medical education in America, young Bigelow went abroad, and spent nearly three years studying in the great hospitals of Paris. It was at a period when the cruel vivisections of Magendie and his contemporaries had become the scandal of civilization, and there can be no doubt that Dr. Bigelow witnessed every phase of vivisection that his sensibilities permitted him to observe.

Returning to Boston in 1844, the young surgeon rapidly attained a prominent position. In January,

1846, before he had completed his twenty-eighth year, he was appointed visiting surgeon of the Massachusetts General Hospital. Here on November 7, 1846, there occurred one of the greatest of historic events—the first surgical operation in which insensibility to pain was secured by the inhalation of ether. Dr. Bigelow's enthusiasm for the new discovery was very great, and it has been said that to him " the world was indebted for the introduction of anæsthesia in surgery at the exact time in which it occurred."

Dr. Bigelow was surgeon to the Massachusetts General Hospital from 1846 to 1886—a period of forty years. He was professor of surgery in Harvard University from 1849 to 1882, or a third of a century. When he resigned the latter position, President Eliot in his annual report referred to him as " a discoverer and inventor of world-wide reputation, a brilliant surgical operator, a natural leader of men." The faculty of Harvard Medical School also spoke of him as one " who had done so much to render this school conspicuous and to make American surgery illustrious throughout the world." This is high praise. Let it be remembered in reading his opinions concerning vivisection.

An abhorrence of pain was a marked trait in Dr. Bigelow's character. Even to the infliction of necessary suffering he had an extreme dislike. His gentleness to animals was akin to his tenderness for children. He had a great respect for their intelligence, their affection, their confidence in mankind. Toward the close of life he had among his pets a number of the little animals most closely related to human beings, and therefore the most-prized " material " of the vivisector. But such

was Dr. Bigelow's sympathy with his little friends that he disliked to take visitors into their presence, and when he did, always cautioned them to assume a smiling face. He was unwilling to give his pets even the mental suffering of anxiety or fear.

He died October 30, 1890, at the ripe age of seventy-two. It was Dr. Oliver Wendell Holmes, himself illustrious in science and in literature, who referred to the name of Dr. Henry J. Bigelow as " one of the brightest in the annals of American surgery, not to claim for it *a still higher place in the history of the healing art.*"

Such a tribute was well deserved. His was the most eminent name in the annals of American surgery. It was from this man, occupying such a position in the medical profession, that we have one of the strongest protests, one of the clearest, most discriminating, and emphatic criticisms of unregulated and unrestricted vivisection that the world has known. It is particularly valuable, because Dr. Bigelow was never an anti-vivisectionist, if by that term we mean one who is opposed to all experiments upon animals. But there are things done in the name of Science which he utterly repudiated and condemned as cruelty, and against which he made a protest that should never be forgotten until the evil shall be condemned by the universal judgment of mankind.

It is probable that Dr. Bigelow's first protest against the abuses of vivisection was in course of an address delivered before the Massachusetts Medical Society in 1871. It is not difficult, perhaps, to detect the reason for its utterance. Dr. H. P. Bowditch, for very many years afterward the professor of physiology in Harvard

Medical School, graduated in 1868 from that institution, and went abroad to study physiology in Europe. There he remained about three years, and on his return in 1871 he was given the opportunity of introducing laboratory methods and all the newer processes of experimentation into Harvard Medical School. Now, the address from which the following extracts are taken was delivered on May 7, 1871. Perhaps the inference is not an unreasonable one that Dr. Bigelow was here protesting, and protesting in vain, against the introduction in America of those methods of vivisection which he always regarded with abhorrence and detestation.

In this address he says:

"The teacher of the art of healing has no more right to employ the time of the ignorant student disproportionately in the pleasant and seductive paths of laboratory experimentation—because some of these may one day lead to pathology or therapeutics—than a guardian has to invest the money of his ward in stocks or securities of equally uncertain prospective value to him.

"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 practised 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 or of a tungstate of zirconium, perhaps to be confuted the next year, perhaps to remain a fixed truth of immediate value,—*. . . contemptibly small 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 one-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 farther—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.

"My heart sickens as I recall the spectacle at Alfort in former times, of a wretched horse—one of many hundreds, broken with age and disease resulting from life-long and honest devotion to man's service—bound upon the floor, his skin scored with a knife like a gridiron, his eyes and ears cut out, his arteries laid bare, his nerves exposed and pinched and severed, his hoofs pared to the quick, and every conceivable and fiendish torture inflicted upon him, while he groaned and gasped, his life carefully preserved under this continued and hellish torment from early morning until afternoon, for the purpose, as was avowed, of familiarizing the pupil with the frenzied motions of the animal. This was surgical vivisection on a little larger scale, *and transcended but little the scenes in a physiological laboratory.* I have heard it said that somebody must do it. I say it is needless. NOBODY SHOULD DO IT. *Watch the students at a vivisection; it is the blood and suffering,* not the science, that rivet their breathless attention. If hospital service makes young students less tender of suffering, vivisection deadens their humanity, and begets indifference to it."

Let us pause for a moment. These are words of great import. They are as true to-day as when first uttered. Who was the speaker? The most eminent surgeon in America in his day. He was professor of surgery in Harvard University, and the leading member of its faculty. He was the surgeon of the Massachusetts General Hospital. He had seen the first surgical operation under complete anæsthesia that the world had known. Learned societies in Paris, in London, in other countries of Europe, were proud to number him among

their members. He had reached the age of assured eminence, where all fear of opposing influences that might disastrously affect the medical career of a younger man, had no weight. Surely, if any living man can speak with authority, he speaks now.

And before whom does he speak? He is not addressing a general audience. It is a meeting of the Massachusetts Medical Society, an association of the physicians and surgeons of that Commonwealth. Some of them had also seen vivisection as practised in Paris and Leipsic. Here was a man at the head of their profession protesting against the introduction of the vivisection laboratory system in his own country.

He insists over and over again that we cannot tell the degree of agony inflicted by experiments upon the nervous system, nor measure its intensity:

"Who can say whether a guinea-pig, the pinching of whose carefully sensitized neck throws him into convulsions, attains this blessed momentary respite of insensibility by an unexplained special machinery of the nervous currents, *or a sensibility too exquisitely acute for animal endurance?* Better that I or my friend should die than protract existence through accumulated years of torture upon animals whose exquisite suffering we cannot fail to infer, even though they may have neither voice nor feature to express it."

It is not the fact of suffering, but the useless waste of suffering that chiefly repels him:

"If a skilfully 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 skilful experimenter, and not to demonstrate it to ignorant classes and encourage them to repeat it."

One cannot but remark the clear distinction of views which these words indicate. No antivivisectionist would accept the suggestion of a single experiment. Dr. Bigelow is speaking as a restrictionist against the free and unlimited vivisection which he rightly foresaw was about to be introduced into this country, and which has become the practice of the present day. He realizes that if once the laboratory system gains a foothold in his own college, the system will spread throughout America:

"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."

Nor was this the only expression of Dr. Bigelow's opinions. In his work on "Surgical Anæsthesia," he left on record an even stronger condemnation of the abuses of vivisection and the cruelties which pertain to it. As he quotes from Stanley's "In Darkest Africa," which was published in 1890, it is evident that it represents his mature and settled judgment, down to the very close of his long and distinguished career. In this work he says:

"There can be no question that the discussion of vivisection arouses antagonistic human instincts. It is no common subject which enlists such earnest and opposite opinions. That there is something wrong about it is evident from the way in which the reputation of inflicting its torture is disclaimed. That for some reason it is a fascinating pursuit is equally evident from the bitter contest made for the right to practise it.

"There is little in the literature of what is called the 'horrors of vivisection' which is not well grounded on truth. For a description of the pain inflicted, I refer to that literature, only reiterating that what it recounts is largely and simply fact, selected, it may be, but rarely exaggerated.

"Vivisection is not an innocent study. We may usefully popularize chemistry and electricity, their teaching and their experimentation, even if only as one way of cultivating human powers. But not so with painful vivisection. We may not move as freely in this direction, for there are distinct reasons against it. It can be indiscriminately pursued only by torturing animals; and the word 'torture' is here intentionally used to convey the idea of very severe pain—sometimes the severest conceivable pain, of indefinite duration, often terminating, fortunately for the animal, with its life, but as often only after hours or days of refined infliction, continuously or at intervals."

It is here that Dr. Bigelow differs radically from the advocates of free vivisection. To them there appears no reason why the science of physiology should not "move as freely" in experimentation as the sciences pertaining to any other subject. The closed laboratory evinces the desire and intention to "move freely," without criticism or restraint.

No physician in America of Dr. Bigelow's eminence has ever stated so distinctly the fact of torment in vivisection, and the reasons for its condemnation:

"A man about to be burned under a railroad car begs somebody to kill him; the Hindoo *suttee* has been abolished for its inhumanity; and yet it is a statement to be taken literally that

a brief death by burning would be considered a happy release by a human being undergoing the experience of some of the animals who slowly die in a laboratory. Scientific vivisection has all the engrossing fascination of other physical sciences, *but the transcendent torture sometimes inflicted has no parallel in any of them.* As to its extent, we read that in course of ten years seventeen thousand dogs were dissected alive in one laboratory."

Why, then, does not a universal protest arise against such infamous cruelty? On this point Dr. Bigelow is very frank. It is because of the confidence which the general public places in the average scientist. Is he deserving of that implicit faith? Dr. Bigelow does not think so. He says:

"The difficulty is that the community, for want of time or opportunity themselves to investigate the subject, *are willing to rely upon the discretion of scientific men.* This is an error. . . . A recent distinguished writer, a good judge of men, makes the following observation: 'Who can say why the votaries of science, though eminently kind in their social relations, are so angular of character? In my analysis of the scientific nature, I am constrained to associate with it (as compared with that of men who are more Christians than scientists) *a certain hardness, or rather indelicacy of feeling.* They strike me as being . . . coolly indifferent to the warmer human feelings.'[1]

"It should not for a moment be supposed that cultivation of the intellect leads a man to shrink from inflicting pain. Many educated men are no more humane—are, in fact, far less so—than many comparatively uneducated people. . . . The more eminent the vivisectionist, the more indifferent he usually is to inflicting pain; however cultivated his intellect, he is sometimes absolutely indifferent to it. . . .

"But in order to oppose vivisection to best advantage, and especially lest he should place himself in a false position, the antivivisectionist should bear clearly in mind that what he opposes is *painful* vivisection only. For there have been wholly painless experiments upon living animals which have

[1] Sir Henry M. Stanley, "In Darkest Africa."

led to useful results. Some of the greatest discoveries in medical science were made with no pain whatever. . . . And yet they have been often and sophistically cited by the vivisector as plausible arguments for inflicting both excessive and useless pain. The fact that a few able men have made discoveries by certain painless experiments upon animals is used to justify the demonstration of torture to medical students (to whom it is as profitless as any medical information can be), and its practice by them. The discovery of anæsthesia has been time and again quoted in favour of vivisection. *This is simply preposterous.* In making that discovery, the experiments from the beginning were painless, and were therefore wholly unobjectionable—as I happen to know, having seen the first of them. The same is true of Jenner's vaccination, which was a wholly painless discovery. Little pain was involved in all that was needed to discover the circulation of the blood, which was inferred from the valvular construction of the veins, and then easily substantiated. . . . The greatest prizes in the lottery of physiological and pathologicai discovery have involved little or no pain. But the usual and staple work of a so-called 'laboratory of vivisection, physiology or pathology,' for the education and practice of medical students in the unrestricted cutting of living animals, and for the indiscriminate and endless repetition of experiments already tried, where a live dog can be bought and its living nerves dissected, . . . all this is a very different affair. A distinguished vivisector once remarked: 'To us, pain is nothing.' When it is remembered that this pain may be, and sometimes intentionally is, of the most excruciating nature possible for human science to invent, and that in a large majority of instances it is to little or no purpose, the remark of this vivisector covers the objectionable ground."

In view of the foregoing quotations, it would appear almost impossible for Dr. Bigelow's position to be misrepresented or misunderstood. He cannot be regarded as an antivivisectionist, for he repeatedly states that to painless experiments upon animals no objection exists. But of the reality of the torment, and of the blunted sensibility of the professional tormenter, he seems to

have no doubt. How may reform be promoted? By legal supervision and regulation. A few further extracts from Dr. Bigelow's writings will bring these points into prominence:

"There can be no question that the practice of vivisection *hardens the sensibility of the operator*, and begets indifference to the infliction of pain, as well as great carelessness in judging of its severity.

"Indeed, vivisection will always be the better for vigilant supervision, and for whatever outside pressure can be brought to bear against it. Such pressure will never be too great, nor will it retard progress a hair's-breadth in the hands of that very limited class who are likely materially to advance knowledge by its practice.

"The ground for public supervision is that vivisection, immeasurably beyond any other pursuit, involves the infliction of torture to little or no purpose. Motive apart, painful vivisection differs from that usual cruelty of which the law takes absolute cognizance mainly in being practised by an educated class, who having once become callous to its objectionable features, find its pursuit an interesting occupation under the name of science. In short, though vivisection, like slavery, may embrace within its practice what is unobjectionable, what is useful, what is humane, and even what is commendable, it may also cover what is nothing less than hideous. I use this word in no sensational sense, and appeal to those who are familiar with some of the work in laboratories and out of them to endorse it as appropriate in this connection. . . .

"'But burning was useless, while vivisection is profitable.' Here we reach the kernel of the argument of the pain-inflicting vivisector. The reply is that by far the larger part of vivisection is as useless as was an *auto da fé*. It does not lead to discovery. The character of the minds of most of those who usually practise it makes this hardly a possibility. Real discoverers are of a different texture of mind, which you cannot create by schools; nor can you retard their progress by restrictions, put on all you may. But restrictions will and should cut off *the horde of dull torturers who follow in the wake of the discoverer*, actuated by a dozen different motives, from a desire for research down to

the wish to gratify a teacher or to comply with a school requisition."

How carefully and how clearly the writer has phrased his distinctions between what in vivisection is right and wrong! In all the literature of advocacy for free and unrestricted vivisection can we find anything resembling it? Certainly, I know of no writer favourable to unlimited experimentation who has been equally fair. One surgical vivisectionist is fond of dividing the class interested in discussion of vivisection as "Friends of Research," and "Foes of Research," ascribing to the first all the virtues of good sense, and to the latter all the folly that belongs to ignorance. In which class, we may well wonder, would he place the first American surgeon of his time because he objected only to cruelty and abuse?

To Dr. Bigelow the legal supervision of the laboratory seemed the one practical method by which cruelty might be somewhat restrained, because in this way he believed the public would obtain some knowledge of the practice which is now withheld. He says:

"In order that painful vivisection may be as nearly as possible suppressed, not only by public opinion, but by law, *it is essential that public opinion should be frequently informed of what it is and may be.* Here lies the work of the antivivisectionist. Further, every laboratory ought to be open to some supervising legal authority competent to determine that it is conducted from roof to cellar on the humanest principles, in default of which it should be, as slavery has been, uncompromisingly prohibited wherever law can accomplish this result."

Is the cruelty of unrestricted and unregulated vivisection a reality or a myth? Of his own views on this question we can have no doubt. He says:

"A torture of helpless animals—more terrible by reason of its refinement and the effort to prolong it than burning at the stake, which is brief—is now being carried on in all civilized nations, not in the name of religion, but of science."

"The law should interfere. There can be no doubt that in this relation there exists a case of cruelty to animals far transcending in its refinement and in its horror anything that has been known in the history of Nations.

"There will come a time when the world will look back to modern vivisection in the name of Science, as they do now to burning at the stake in the name of Religion."

Concerning vivisection, then, the views of one of the most eminent surgeons that America has produced may be summed up as follows:

First. He is not favourable to antivivisection, but to restriction. "There is no objection to vivisection except the physical pain."

Second. The cruelties which pertain to certain vivisections and vivisectors are not myths, but realities. For a description of these cruelties, Dr. Bigelow expressly refers to the literature of protest.

Third. In the defence of vivisection or of unrestricted experimentation, he says that *untruthful claims of utility* have been made.

Fourth. The reasons for inflicting prolonged torment upon animals are wholly inadequate for its justification.

Fifth. Vivisection has a hardening tendency upon its practitioners. The more eminent the vivisector, the more indifferent he may become to the infliction of torment.

Sixth. There is ample reason for the interference of the law. Every laboratory should be legally super-

vised. Public opinion should be frequently informed concerning vivisection, its objects, and its methods.

I have presented these opinions at length because they represent exactly the position which I have personally maintained for over thirty years. And if the time shall come, foreseen by him, "when the world will look back to modern vivisection in the name of Science, as we now do to burning at the stake in the name of Religion," then, surely, it will be remembered that the first strong voice in America raised, not in condemnation of all experimentation upon animals, but solely in protest against its cruelty and secrecy, and in appeal for its reform, was that of the leading American surgeon of his time, Professor Henry J. Bigelow of Harvard University.

CHAPTER X

THE REPORT OF THE ROYAL COMMISSION ON VIVISECTION

In the year 1906, a Royal Commission was appointed by King Edward to investigate the practice of animal experimentation. Thirty years had passed since the appearance of the earlier inquiry, upon which was based the English law regulating the practice of such experiments. On the one hand, it had been denounced as affording most inadequate protection to animals liable to such exploitation; on the other hand, in the United States it had been condemned as a hindrance to scientific progress, and a warning against any similar legislation. A new Commission was therefore appointed to inquire into the practice, to take evidence, and to report what changes, if any, in the existing statute might seem advisable.

The composition of the new Commission leaned heavily toward the laboratory. It included no opponent to all vivisection. On the other hand, three of the Commissioners at one time or another had held a licence to vivisect, and one of them seems to have held this permission for some fourteen years. The Commission also included among its members the permanent Under-Secretary to the Government—an official whose acts had again and again been arraigned, and were soon to

be challenged once more. The unusual spectacle was therefore to be presented of men sitting in judgment upon themselves. One of the Commissioners—Dr. George Wilson, well known for his work regarding the public health—had at various times questioned the conclusions of certain experimenters, but he was not opposed to all research upon animal life. From a Commission so constituted, we might have expected as the final result of their labours a report favourable to the interests of the laboratory, to marked modifications of the existing law by a lessened stringency of inspection, to relaxation of restrictions, and to an endorsement of every claim of utility which the experimenters should put forth.

Such an outcome of the deliberations of the Royal Commission must have seemed to American vivisectors almost a certainty. During the past twenty years, repeated attempts have been made in New York, in Massachusetts, in Pennsylvania, and in the city of Washington, to obtain some legislation regulating the practice of animal experimentation to the extent which obtains in England. At "hearings" before various legislative and Senate Committees, all such attempts have been vigorously combated by representatives and defenders of the physiological laboratories, and their strongest argument has always been the exceedingly detrimental effect of the English Act of 1876 both upon medical education and upon the progress of medical science. Professor Bowditch once said:

"The amount of mischief which may be produced by the English law depends very much on the good judgment of the Home Secretary. . . . In general, it may be said that the

system of licensing and Government inspection is *under the most favourable conditions* a source of serious annoyance to investigation."

We shall have reason hereafter to see the inaccuracy of this statement, so far as may be evinced by the opinions of English physiologists and teachers.

Upon the secrecy now maintained in English laboratories, a vivid light is thrown by the evidence given before the Commission. Quite as strong as in America have been the precautions taken in England to prevent any knowledge of the methods of vivisection from coming before the general public except through the assertions of the experimenters themselves. In America, where we have no legal limitations to experimentation, such secrecy occasions no surprise; but that in England the laboratory had secured so complete a degree of security from criticism by concealment of that which we are told needs no concealment gives reason for questionings. One of the Government inspectors—a Dr. Thane—insists that although a physiological laboratory is open to the visits of medical students at any time, it would hardly be possible to permit a similar privilege to physicians not in sympathy with experimentation. "I see no way of doing it," he declares. He does not seem to be certain that one of the Royal Commissioners before whom he was giving evidence could be admitted. Dr. George Wilson asks him the question in regard to seeing the various operations which are open to medical students. "I can go and see them? I suppose I would have no difficulty?" Dr. Thane's reply was by no means assuring. "I do not see how it could be done," he replied. He could

not see how one of the most distinguished physicians of England could secure the legal right of admission to a physiological laboratory!

Some of the evidence given regarding this point seems a little suggestive of a willingness to mislead a thoughtless questioner. Was there any wish to give an impression that the secrecy of the laboratory did not exist? One of the Government inspectors—Sir James Russell—informed the Commissioners that *he* never had any difficulty in getting into laboratories. "I simply walk into them, and have always found the doors open," as if that proved that there was nothing to be concealed. The professor of physiology at University College was particularly examined on this point. "Would there be any difficulty in a doctor who was very strongly opposed on all grounds to experiments on animals presenting his card and being present?" "None whatever," was the Professor's answer to his questioner, the Chairman of the Commission. "I want to see," added Lord Selby, "what sort of check there is upon the neglect of the statute; . . . whether any medical man who disagreed with the Act and disagreed with vivisection altogether would be able to attend?" "In these advanced lectures there is no means by which we can prevent him from attending," was the instant reply. "In point of fact, are *any* steps taken with a view of preventing it?" "None whatever," was the reply. "There is *nothing* to prevent it?" persisted Lord Selby; and the reply of the professor was reiterated: "There is nothing to prevent the attendance of any medical man at these advanced lectures."

The distinguished jurist undoubtedly believed that

by these repeated interrogations he had reached a complete denial of the secrecy of experimentation so far as the witness was concerned.

On the day following, the same professor of physiology continued his evidence, and another member of the Commission—A. J. Ram, Esq.—" one of our counsel learned in the law," took part in the examination. " One hears a good deal in lay papers and so forth about experiments conducted with closed doors. *Is there anything of that sort at all?*" The very form of his inquiry would seem to indicate his disbelief in the practice of secret vivisection. His question, however, admitted of two different replies. The physiologist might assert the necessary seclusion of physiological experimentation, or he might construe the question in a literal sense as pertaining merely to the locking of his inner door. He preferred the latter course. " I have never come across a laboratory where there were any closed doors. In my laboratory any student wanting to speak to me walks straight in. The door of my laboratory, where I do the chief part of my work, *is always open to the passage.*"

This is very clever. The two leading lawyers of the Commission have sought to get at the truth concerning the secrecy of vivisection, and apparently are quite satisfied. But some hours later another member of the Commission, a plain Member of Parliament, without skill of fence or experience in the examination of witnesses, asks a question or two. " You have told us," said Mr. Tomkinson, " that any medical man, on presenting his card, can obtain admission at once to a laboratory ?"

Here was an inquiry that could be answered but in one way. "No," replied the physiologist; "to the advanced physiological lectures which are given in the University of London." "*Not to witness any operation?*" "No; only to witness the demonstrations that are given in those lectures." "But might not the public be more satisfied if a layman—a Member of Parliament, for example—had the right of entry on presenting his card?" "Do you mean to the advanced lectures or to the laboratory?" "I mean to an operation *in the laboratory:* say a Member of Parliament or anyone whose position is assured?" "I should be only too pleased to see any Member of Parliament or any layman who had any doubt about it if he presented his card, but I *should have to be satisfied of his bona fides.*"

It is a pity that no one thought to ask the physiologist how he expected a Member of Parliament to prove his "good faith" before he could enter precincts open to every student of the University. Sir William Church came to his assistance by suggesting that the professor would admit anyone "vouched for" by a person whom you know, or whose position you know; but the curt monosyllabic reply was not indicative of a welcome, and it was quite different from the conditions which had just been laid down. The doors of the laboratory are "open," but only to those in whose silence and discretion the vivisector may trust.

A considerable amount of testimony was devoted to the alleged painfulness of vivisection. It is the great problem. If the absence of sensation were a certainty in all operations of the kind, there would be no reasonable objection to them, no matter to what

extent they might be carried. The physiologists of the present day occupy a somewhat different attitude from those of half a century ago, or of yet later periods. Thirty years ago, one of the leading experimenters in England declared that he had "no regard at all" for the pain inflicted upon a vivisected animal; that he never used anæsthetics except when necessary for personal convenience; and that he had "no time, so to speak, for thinking what the animal will suffer." We find no such profession of indifference in the testimony of modern physiologists. What seems to take its place is, in many cases, a denial of the existence of pain in the experimentation of the present day. Does anything here turn upon a definition of words? A professor at King's College, London, giving his testimony, affirmed that "no student in England has *ever seen pain* in an animal experiment"—a statement which in one sense everyone can accept, for who can say that he ever *saw* a pain anywhere? Professor Starling, of the University College in London, declared that during his seventeen years of experimentation "on no occasion *have I ever seen pain* inflicted in any experiment on dog, cat, or rabbit in a physiological laboratory in this country." The experimenter is undoubtedly correct. Neither he nor anyone else in or out of a laboratory has ever "*seen pain.*"

Some of Dr. Starling's testimony on the subject of pain is very curious. Pain, he tells the Commissioners, "would spoil the experiment," and "*a physiological experiment which is painful is thereby a bad experiment.*" He is asked whether "there are any operations performed under circumstances in which the animal is

necessarily and intentionally sensitive to some pain?" Without any apparent hesitation he replied: "*No, never.*" Surely this is a remarkable assertion. He is not speaking, so far as one can see, of his own laboratory, but of all the laboratories of the world. If, since the discovery of anæsthesia over sixty years ago, there has been painful physiological experimentation in England, in America, or on the Continent of Europe, *it has been bad experimentation. The pain inflicted has spoiled their work.* One may not be inclined to dispute this opinion, and yet be quite certain that some very eminent vivisectors in Europe and America would question its accuracy so far as their own work is concerned.

It is interesting to compare these assertions with the testimony given by another physiologist—Dr. Pembrey, the lecturer on physiology at Guy's Hospital in London. He tells the Commission that "a common-sense view should be taken of the question," and then makes a definite admission that by no means bears out the contention of the physiologist of University College. "*I admit,*" said Dr. Pembrey, "*that I have done painful experiments,* and I am not ashamed of admitting it." He goes yet further, declaring that if you caused an animal to suffer extreme agony, the pain itself might be so severe as to render the creature unconscious. It is probable that the physiologist could not have foreseen the results of his candid admissions. When the Commission made their final report, they expressed unanimously the opinion that "to grant a licence to any person holding such views as those formerly expressed by Dr. Klein and as those entertained by Dr. Pembrey is

calculated to create serious misgiving in the mind of the public."

Closely allied to this question is the problem of anæsthesia. Fifty years ago ether and chloroform were administered to animals very much as they were given to human beings undergoing operations in surgery. An animal returning to consciousness gave abundant evidence of its sensibility to suffering by its struggles and cries. The experimenter might try to believe that the pain was slight, but he never disputed its existence. To-day, all this is changed. As much or as little of the anæsthetic may be given as the vivisector desires, and yet he may declare that "*anæsthetics were used*," no matter how slight the degree of sensibility thus induced. It is a known fact that a dog is very susceptible to the action of chloroform, so that during its administration death frequently occurs. Sir Thornley Stoker, the President of the Royal Academy of Medicine in Ireland, and for many years a teacher of science, testified before the Commission that a dog's heart is very weak and irregular, and susceptible to the poisonous influence of chloroform. Over and over again he expresses the doubts that arise concerning the administration of chloroform. "I fear that, particularly in the case of dogs, *anæsthesia is not always pushed to a sufficient extent*, as these animals often die from the effects of the anæsthetic if given to a full extent. . . . I am never sure, if I give a dog chloroform, that I will not kill it. . . . *The anæsthesia cannot be complete* if the dog lives as long as is necessary for some of these experiments." Even for one hour he believes it would be generally impossible to keep a dog alive under full

anæsthesia. On the other hand, Dr. Starling declared that "there is no difficulty in keeping an animal alive as long as you like," and Sir Victor Horsley affirmed that one could keep a dog under chloroform "*for a week*, if you only take the trouble."[1]

The discrepancy here would seem insurmountable. May it not be more in appearance than in reality? One man tells me that arsenic is a poison, very liable to cause death. Another affirms that he has taken it for days in succession, and has experienced no unpleasant results. Both statements can be true, for they need not refer to the same amount. In the modern laboratory there is little danger that the animals will succumb to the effects of the anæsthetic. Assuredly we may question the completeness of that insensibility which Sir Victor Horsley apparently declares may be maintained for a week.

The use of the substance known as *curare*, either alone or in connection with anæsthetics or narcotics, was naturally a subject of passing inquiry. So slight is the knowledge afforded by certain physiologists that it would almost seem that they were united in a "conspiracy of silence" regarding it; in neither of the last two editions of the "Encyclopædia Britannica" is there more than a casual reference to the poison, and no reference to its origin. "What is it?" asked one of the Commissioners. "Is it an herb?" A brief account of the poison, in view of an ignorance so widespread, is not out of place.

Curare is the arrow-poison of certain tribes of South American Indians. It was first brought to the know-

[1] See Minutes of Evidence, November 13, 1907, Q. 15,649.

ledge of Europeans by Sir Walter Raleigh on his return from a voyage to Guiana in 1595, over three centuries ago. Its actual composition, even at the present time, is unknown; it is probable that different tribes of savages have their special methods of preparing it. Some travellers claim that it consists only of a decoction of poisonous plants; others believe that with such substances are mixed the fangs of snakes, and certain species of poisonous ants, the whole compound being boiled down to the consistency of tar.

The action of the poison thus made is exceedingly rapid. Numerous experiments by different observers have demonstrated that it swiftly destroys the functions of the motor nerves of the body, leaving the sensory nerves unaffected to any extent. Claude Bérnard, who made many experiments with curare, came to the same conclusion; it abolishes the power of motion, but has no effect upon the nerves of sensation. An American physiologist, Dr. Isaac Ott, tells us that it is able to render animals immovable "by a paralysis of motor nerves, *leaving sensory nerves intact.*" Bérnard asserts as the result of numerous experiments that in an animal poisoned by curare, "its intelligence, sensibility and will-power are not affected, but they lose the power of moving;" and that death, apparently so calm, "is accompanied by sufferings the most atrocious that the human imagination can conceive." Although it may seem to be a corpse without movement, and with every appearance of death, "sensibility and intelligence exist . . . it hears and comprehends whatever goes on, and feels whatever painful impressions we may inflict." It is only within late years, and since the employment

of curare has been denounced, that anyone has suggested any doubt of these physiological conclusions.

It has been found by physiologists that if the throat of a dog be severed and the windpipe exposed and artificial respiration kept up, all the functions of life may be greatly prolonged; and if curare be used, the creature does not die, although it feels. Supposing that morphia or chloroform be administered at the same time—is the animal, notwithstanding, conscious of pain? Professor Starling admitted in his evidence that if the anæsthetic passed off, the curarized animal would be unable to move or to show any sign of suffering; there would be no possibility of a dog whining or moaning; "it could not, under curare," he frankly admits. Dr. Thane, one of the Government inspectors of laboratories, gave interesting evidence on this point, in reply to questions of one of the Commissioners.

"What is the object of giving curare when you are going to give an anæsthetic?"

"The object of giving curare is to stop all reflex movements. . . ."

"It would stop all struggling, would it not?"

"*It would stop all struggling.*"

"That is to say, it would put an end to the usual signs of the animal not being properly under anæsthesia?"

"That is so."

"And in that case the experimenter has to depend solely, not upon the attendant, but upon the accuracy of his apparatus? He cannot tell from looking at the animal, which is perfectly still, whether it is suffering or not?"

"If his apparatus breaks down, the animal will die of suffocation; it will not get air."

"Yes, it may die; but so long as it is alive, *he* could not say, *you* could not say, *I* could not say—if I were present—that the animal was properly under anæsthesia, *if there were no signs by which you can tell?*"

"We could say the animal is respiring air which is charged with anæsthetic in sufficient quantity to keep it anæsthetized before we gave it curare."

"That is all you could say?"

"That is all we could say."[1]

And this pious opinion Dr. Thane reiterates to other questioners. It fails to satisfy except where faith is strong. "The curious thing to me," said Dr. George Wilson, "is that you or anyone else can say positively that an animal which cannot, by moving, give any indication that it is not completely anæsthetized during all this time that it is under a terribly severe operation does not suffer. . . . I cannot understand such a positive statement." And after Dr. Starling had admitted the impossibility of a dog, under curare, making any cry, Dr. Wilson rejoins: "*Then how can you tell that it suffers no pain?* You may hope and believe, but how can you tell that during a prolonged and terrible experiment, the animal suffers no pain?" The only reply that the experimenter could give was a reiteration of faith in the working of the apparatus.

And here, for the present, the problem must be left. Its only answer is a guess. Yet it should be capable of a definite solution. Every year, in our great cities, it becomes necessary to put homeless dogs out of existence in some merciful way. It should be possible, by use of chloroform, to determine which theory is true. If, under proper circumstances, a dozen animals were made absolutely unconscious by the use of chloroform, as insensible as human beings are made before a capital operation, so that the corneal reflex is abolished, could

[1] Evidence taken November 21, 1906.

this degree of unconsciousness be maintained " as long as any experimenter desired " ? Would it even be possible as a rule to keep them alive a week, yet completely anæsthetized ? Or, on the contrary, would such animals be peculiarly liable to sudden death from the effects of the chloroform ? One cannot doubt the possibility of laboratory anæsthesia being maintained indefinitely; but how is it with complete and full surgical anæsthesia ? Until such appeal to science shall have been made in the presence of those who doubt, and are able to judge, the question cannot be regarded as settled. There are those who will believe that the older investigators were right; that the perfect insensibility to pain is not invariably attained in these cases; and that both in English and American laboratories the most hideous torments are sometimes inflicted upon man's most faithful servant and friend. Even Dr. Thane, the Government inspector, admitted that in making reports the inspector " never could determine which experiments were painless and which were painful."

The evidence given by experimenters was frequently very curious, and sometimes suggestive. Professor Starling, for example, testified that dogs exhibited no fright or fear at entering a vivisection chamber; there are no signs " that they have *any idea of what they are going to suffer*," said the physiologist; " that is a great consolation in dealing with animals, as compared with dealing with a man." [1] " *Going to suffer* " is a somewhat significant admission. He is asked whether the experimentation of to-day is more or

[1] Minutes of Evidence, Q. 3,885.

less humanely conducted than it was before the Act of 1876; and instead of replying he tells the Commissioners that "there was very little work carried out before the Act; *there were only one or two physiologists.*" Upon such ignorance of history comment is hardly necessary. We have heard much concerning a "wonderful discovery" of a Dr. Crile, the giving of morphia before a surgical operation, in order to quiet the apprehensions of the patients and so to prevent the occurrence of shock. Yet as long ago as 1906, Dr. Thane, a member of the Royal College of Surgeons, testified, upon the authority of a distinguished scientist, that such use of morphia before administration of anæsthetics "is often done in surgical operations." The attention of Sir Victor Horsley was called to the experiments of a Dr. Watson in America. Had he heard of them?

"Yes, I know of those experiments," was the reply.

"Were they, in your opinion, valuable experiments?"

"I cannot, at the moment, call to mind whether they revealed any new conditions. I should have to look them up again."

"Were they justifiable, in your opinion?"

"*Certainly,*" was Sir Victor Horsley's terse reply.

Yet, when the account of these experiments was first published, the *British Medical Journal*, in its editorial columns, thus commented upon them:

"The present pamphlet calls for our strongest reprobation as a record of the most wanton and stupidest cruelty we have ever seen chronicled under the guise of scientific experiments. . . . Apart from the utterly useless nature of the observations, so far as regards human pathology, there is a callous indifference shown in the description of the suffering of the poor brutes

which is positively revolting. . . . *We trust that no one, in the profession or out of it,* will be tempted by the fancy that these or such-like experiments are scientific or justifiable."

It will be seen that concerning Watson's most cruel vivisections Sir Victor Horsley was not in agreement with the *British Medical Journal,* the official organ of the Association of which, before the Commission, he appeared as the representative !

The final report of the Royal Commission occupies a volume. The long period over which the inquiry extended, the generally apparent desire to permit every phase of opinion to have a hearing, all tended toward views which, if not unanimous, at any rate indicated a desire to be fair. Taken as a whole, the evidence and the final decisions of the Commission constitute the most important contribution to the literature of animal experimentation which has appeared during the present century.

The conclusions of the Commission are almost, yet not quite, unanimous. All of the eight members signed the final report, three of them, however, making their assent subject to a qualifying memorandum that in certain respects indicated a considerable divergence of opinion. The following are the conclusions of the Commission, the words in italics and parentheses being the qualifying additions of one of their number, Dr. George Wilson.

"Altogether, apart from the moral and ethical questions involved in the employment of experiments on living animals for scientific purposes, we are, after full consideration, inclined to think—

"1. That certain results, claimed from time to time to have been proved by experiments upon living animals, and alleged to

have been beneficial in preventing and curing disease, have, upon further investigation, been found to be fallacious or useless. (*Indeed, the fallacies and failures are, in my opinion, far more conspicuous than successful results.*)

"2. That notwithstanding such failures, valuable knowledge has been acquired in regard to physiological processes and the causation of disease, and that (*some*) methods for the prevention, cure, and treatment of certain diseases (*other than bacterial*), have resulted from experimental investigations upon living animals.

"3. That, as far as we can judge, it is highly improbable that, without experiments made upon animals, mankind would by now have been in possession of such knowledge.

"4. That in so far as disease has been successfully prevented, or its mortality reduced, suffering has been diminished in man and the lower animals.

"5. That there is ground for believing that similar methods of investigation, if pursued in the future, will be attended with similar results." (*Failures plentiful enough still, but successful results fewer and fewer as the field of legitimate research must become gradually more and more restricted.*)

Other conclusions appear to be as follows:

"We strongly hold that limits should be placed to animal suffering in the search for physiological or pathological knowledge."

How far interference with experimentation should extend appears to have been a matter of divergent views. Five of the Commissioners took the following position:

"An Inspector should have the power to order the painless destruction of any animal which, having been the subject of any experiment, shows signs of obvious suffering or considerable pain, even though the object of the experiment may not have been obtained; and

"That in all cases in which, in the opinion of the experimenter, the animal is suffering severe pain which is likely to endure, it shall be his duty to cause painless death, even though the object of the experiment has not been attained."

Three of the Commissioners—Sir William J. Collins, M.D., Dr. George Wilson, and Colonel Lockwood—do not agree with this clause. They cannot approve of a rule which leaves to the discretion of the vivisector the right of keeping alive for an indefinite period, a suffering creature. They recommend that all observations, "likely to cause pain and suffering shall be conducted under adequate anæsthetics, skilfully and humanely administered, or if the nature of the investigation render this impracticable, then, that on the supervention of real or obvious suffering the animal shall be forthwith painlessly killed."

The Commission recommended that, in certain cases, immediate or special records or reports of results should be furnished by the experimenter. The three members just named agree with this, but would have such reports the rule, and not the exception. With this view I am personally in emphatic accord. Every experiment should have its complete record, available for publication if so desired.

That part of the final report which in certain respects is more valuable than all the rest, is the reservation memorandum of Dr. George Wilson, one of the Commissioners. He is not an antivivisectionist, for he agrees with the unanimous conclusion of his associates that "experiments upon animals, adequately safeguarded by laws faithfully administered, are morally justifiable." Regarding the practice as now carried on, he maintains the only scientific position, that which more inclines to doubt than to credulity. The assurances of witnesses, that in certain experimental operations no pain was inflicted, Dr. Wilson accepts "as

opinions to which the greatest weight should be attached, and not as statements of absolute fact, so far as specific instances are concerned." That insensibility to pain is invariably maintained is by no means sure; "however confident the operator may be that he has abolished all pain, *vivisectional anæsthesia, with all its varieties of agents and methods of induction, can never be divested of an element of uncertainty.*"

What are we to say of the results, either to science or the art of healing, which modern vivisection has contributed? It is regarding this point that Dr. Wilson has brought together a mass of evidence of unquestionable value, in a field of inquiry peculiarly his own. For more than thirty years he had been a writer upon topics pertaining to the Public Health. One by one, in his memorandum, Dr. Wilson has examined the claims of vivisection regarding the chief forms of disease which have occupied the attention of experimenters—cancer, which still maintains its advance in fatality; tuberculosis, which began to decline in England more than forty years ago, before it was associated with experimentation; hydrophobia, diphtheria, tetanus, typhoid fever, snake-poison, sleeping-sickness, and certain animal ailments of an infectious character. What is his conclusion regarding all the claims of vastly increased potency of modern medicine over these powers of darkness and death? That experiments have been utterly valueless? No; some useful knowledge has been acquired, in certain directions. "But I still contend, and have endeavoured to prove, that the useful results which have been claimed, or may still be claimed, *have been enormously over-estimated.*" And the final conclusion of this keen

observer and lifelong student of medicine is this: "That experiments on animals, no matter with what prospective gain to humanity, are repellant to the ethical sense; and that those who persistently advocate them as beneficial to human or animal life *must justify their claims by results*. . . . Even admitting that experiments on animals have contributed to the relief of human suffering, such measure of relief is infinitesimal compared with the pain which has been inflicted to secure it."

What changes in the existing law of England regarding animal experimentation, or in the administration of the Act, did this Commission recommend ?

First. An increase in the number of inspectors. "The inspectors should be sufficiently numerous and should have at their command ample time to afford to the public reasonable assurance that the law is faithfully administered."

Second. Restrictions in the use of curare. "We are all agreed, that if its use is to be permitted at all, an inspector, or some person nominated by the Secretary of State, should be present from the commencement of the experiment, who should satisfy himself that the animal is throughout the whole experiment and *until its death in a state of complete anæsthesia.*"

This is a most remarkable recommendation. Can it imply anything else than distrust of the experimenter ?

Third. "*Stricter provisions regarding the practice of pithing.*" The operation must be complete; performed only under an adequate anæsthetic; and by a licensed person when made on a warm-blooded animal.

Fourth. "*Additional restrictions regulating the pain-*

less destruction of animals which show signs of suffering after experiment."

To this recommendation and its suggested amendment by three of the Commissioners, reference has already been made.

Fifth. " *A change in the method of selecting* and in the constitution of the Advisory body to the Secretary of State."

Sixth. " *Special records by experimenters in certain cases.*" On this point we have seen that three of the Commissioners went yet farther, and believed that in *all* cases of painful experiment—and, possibly, in all cases whatsoever, such reports should be made.

It is now upwards of thirty-five years since the Act regulating the practice of vivisection in England came into effect. During all that period, in the United States, the law has never ceased to be an object of misrepresentation and attack. Before Legislatures and Senate Committees, on the platform and in the press, by men of good reputation but associated with laboratory interests, the English law has been denounced as a hindrance to scientific progress and a warning against similar legislation in the United States. And yet nothing can be more evident that all these attacks were based upon ignorance and misstatement. We find a Royal Commission in England, composed almost entirely of scientific men, everyone of them favourable to animal experimentation, devoting years to an inquiry concerning not vivisection only, but the working of the law by which it is regulated. And the conclusions reached are in every respect opposed to the statements made by the laboratory interests here. *They fully*

endorse that principle of State regulation, which everywhere in America is so strenuously opposed. But this is not all. Every recommendation made for modification of the Act is in the direction of animal protection, and toward an increased stringency of the regulations relating to animal experimentation. In not a single instance was there recommendation that the regulations should be less stringent; not an instance in which it was suggested that privileges of the vivisector should be enlarged. That this should be the result of an inquiry in this twentieth century, extending over five years, is remarkable indeed. Perhaps there is no reason for surprise that all these conclusions of the Royal Commission were never made known to the American public by the periodicals of the day. Is it possible for anyone to believe that such conclusions would ever have been attained if the denunciations of State regulation of vivisection, proceeding from the American laboratory, had been grounded in truth ?

CHAPTER XI

THE GREAT ANÆSTHETIC DELUSION

A POPULAR delusion is often the basis of a great abuse. If at one time witches were burnt by countless thousands, it was at a period when implicit faith in the reality of diabolic conspiracy was undisturbed by sceptical questionings. Human slavery existed for centuries, not only because it was profitable, but because it came to be regarded as the only conceivable permanent relation between the negro and the white man. The Spanish Inquisition existed for ages, because the pious Spaniard could not believe that the good men who upheld, encouraged, and promoted its activity could be liable to error, or actuated by other than the loftiest principles. Men find themselves deluded not merely because of their faith in the integrity of their fellow-men, but because they have also extended that faith to the accuracy of their opinions.

There can be no doubt of the fact that public apathy regarding the abuses of vivisection as now carried on without limitations or restrictions is grounded upon the great anæsthetic delusion. This misinterpretation of facts, this misunderstanding of scientific statements, constitutes the most singular delusion of the present time.

What is anæsthesia ? It has been defined as a state

of insensibility to external impressions, sometimes induced by disease, but more generally in modern surgery by the inhalation of the vapours of ether or chloroform. The discovery of the properties of these drugs constitutes a very interesting chapter in the story of scientific achievement; but in this connection the chief point of interest lies in the fact that the most wonderful of all advances in medicine was made without resort to the vivisection of animals. Sir Benjamin Ward Richardson, an English scientist who had much to do with its various methods, tells us that "the instauration of general anæsthesia came from experiments on man alone; there is no suspicion of any experiment on a lower animal in connection with it"; and Professor Bigelow, of Harvard Medical School, as we have seen, makes the same statement.

The extent to which insensibility may be carried depends entirely on the amount of the vapour inhaled. Suppose the quantity to be very small. Then the result will be a diminished sensibility, without entire loss of consciousness. Let the quantity inhaled be considerably increased, and we may produce a profound stupor with muscular relaxation; the eyes are fixed, and the eyelids do not respond when the eyeball is touched. There is now deep anæsthesia, and complete unconsciousness to the surgeon's knife. The borderline between life and death is not distant; and if still more of the anæsthetic is administered, we may reach a condition from which there is no awakening. The skill of the anæsthetist is not unlike that of a pilot, who needs to know just how far the ship may be steered in a difficult channel without running upon the rocks.

For a slight operation, a very little of the drug will often suffice. In some hospitals abroad—and perhaps in America—it is the custom not to give anæsthetics to charity patients when the pain is not greater than the extraction of a tooth. Between a light anæsthesia and the deep insensibility required for some capital operation, *there is every conceivable degree.* We see the same thing in ordinary sleep. The deep unconsciousness of a thoroughly exhausted man is vastly different from the light slumber of an anxious mother, who is aroused by a word or touch. Yet both conditions are what we call "sleep."

Now, one of the popular delusions regarding what is called "anæsthesia" arises from ignorance of its innumerable degrees. We are told, for instance, "anæsthetics were used" in certain vivisections. That assertion alone, in a majority of cases, will quiet any criticism. If "anæsthetics were used," then the average reader assumes that of course there was no pain. The experimenter may know better. But if ignorance persists in misinterpreting statements of fact, it is possible that he may think he is not obliged to make the truth plain, to his positive disadvantage. If such method of reasoning ever obtains, it may explain very much.

And yet it would seem that only very ignorant people could be so blinded by authority as not to perceive where the fallacy lies. A slight amount of ether or chloroform may mean to a vivisected animal no protection whatever from extreme pain. The fact has long been known. Many years ago Dr. George Hoggan declared that "complete and conscientious anæsthesia is seldom even attempted, the animal getting

at most a slight whiff of chloroform by way of satisfying the conscience of the operator, *or of enabling him to make statements of a humane character.*" In other words, it enables him to say, " Anæsthetics are always used." Shall we always be blind to the insignificance of that phrase ?

That chloroform or ether will suppress the consciousness of pain during a surgical operation, every reader is aware. But when we speak of certain vivisections, we are on different ground. The pains to be inflicted are sometimes far more excruciating than any surgical operation. In the stimulation of sensory nerves, and in various operations upon these nerves, there may be excited agonies so great that they break through the limited unconsciousness induced by chloroform. One of the most experienced vivisectors in America has given his testimony on this point. Speaking of his experiments upon some of the most exquisitely sensitive nerves, Dr. Flint says: " *When* we have used anæsthetics "—note the significance of the phrase—" *we could never push the effects sufficiently to abolish the sensibility of the root of the nerve.* If an animal, brought so fully under the influence of ether that the conjunctiva had become absolutely insensible " (the degree of insensibility required by the surgeon), " the instant the instrument touched the root of the nerve in the cranium, *there were evidences of acute pain.*"[1] Of other experiments upon the same nerves he tells us that " in using anæsthetics, we have never been able to bring an animal under their influence *so completely as to abolish the sensibility.* . . . In cats that appear to be thoroughly

[1] Flint's " Physiology," vol. iv., p. 97.

etherized, as soon as the instrument touches the nerve, there is more or less struggling."[1]

This statement needs to be remembered. The agony may be so keen, so exquisite, so far beyond the pain of a surgical operation, that it makes itself felt. Pain, then, conquers the anæsthetic, exactly as the anæsthetic usually conquers the pain.

What, then, is the value of the phrase, "*anæsthetics were used*"? Dr. Hoggan has told us. It has no value whatever.

Sir Thornley Stoker, President of the Royal Academy of Medicine in Ireland, and an inspector of laboratories under the Act, was questioned about the pain endured by an animal in course of a prolonged vivisection, and he frankly admitted that a vivisector "could do no more than give an opinion. He could have no *certainty* as to the entire absence, the continuous absence, of pain."[2] Dr. Thane, a professor at University Medical College, London, and a Government inspector, being asked whether one might not be able to distinguish between painful and painless experiments, replied that "the inspector never could distinguish exactly which experiments were painless and which were painful, *and the experimenters and observers themselves* cannot distinguish *in a very large number of cases*."[3]

These are the opinions of experts. This attitude of uncertainty is the only ground possible for a scientific man who aims at stating the whole truth. When a professional vivisector gives us assurance that no pain was felt during the severest operations, he is only

[1] Flint's "Physiology," vol. iv., p. 193.
[2] Evidence before Royal Commission, Question 1,064.
[3] *Ibid.*, Question 1,335.

putting forth an opinion. He is but mortal. We are not obliged to assume his infallibility in a region where experts are in doubt, and where there may be desire for concealment.

During the last decade of the nineteenth century, a work was published describing in detail experiments upon surgical shock—so termed to distinguish it from a similar condition arising from overwhelming emotions. These experiments were almost exclusively made upon dogs, man's faithful friend and companion; and their number was so great and their character so horrible that their publication at first excited general criticism and condemnation. At once the suggestion was put forth that the experiments were painless, because "anæsthetics were employed." The vivisector had said:

"In all cases the animals were anæsthetized, usually by the use of ether, occasionally by chloroform, either alone or with ether. In a few cases *curare and morphine were used.*"

In a number of succeeding volumes, the same assertion has been put forth; and as understood by the average reader, it has tended to dispel doubts regarding the character of the experiments. It seems worth while to examine the account of these investigations a little closely. The question for us is not whether anæsthetics were employed, but to what extent we may find ourselves assured regarding their efficiency in abolishing sensibility in every case.

The experiments in question were of a peculiar kind. They differ in certain respects from anything to be found in the records of American vivisection. The number of dogs sacrificed—148—was far greater than seems necessary to establish any working hypo-

thesis. It would appear that the methods of vivisection selected were generally designed for the purpose of making the strongest possible impression, and, if consciousness was present, the sharpest pangs that human ingenuity could invent were repeatedly inflicted. The most sensitive parts of the body were crushed in various ways. The lungs were stabbed, or shot through; the intestines were lifted from the body, and burned or placed in boiling water; the nerves were exposed and scraped; loops of intestines were manipulated or crushed; the ear was penetrated; the jaws were opened as far as "the maximum normal separation," and then by extraordinary force separated still more; the paws were crushed, and sometimes burnt by the application of a Bunsen's flame; the stomach was dilated by pumping air and water into it till the stomach burst; one animal was subjected to "all kinds of operations for a period of three hours more," including the cutting out of kidneys and double hip-joint amputations; another suffered the opening of the abdomen, the crushing of the kidneys, "severe manipulation of the eye," "severe manipulation of the tongue, puncture, crushing," etc., and lastly, a "stimulation of the sciatic nerve"; in one case, the paw "was placed in boiling water for a considerable time"; in another, "boiling water was poured into the abdominal cavity"; in yet another, flame was applied over the heart. I am not quoting all this from memory; the work describing all these experiments lies open before me as I write. No Iroquois savage, no Spanish inquisitor, no professional tormentor of any age ever devised more exquisite torments, more excruciating agonies, more lengthened

tortures than these 148 vivisections imply—*unless, throughout the entire experiment the complete insensibility of the victims was secured by recognized anæsthetics, beyond the possibility of a doubt.*

Such assurance as this it is now impossible for anyone to give with scientific certainty. The absolute insensibility of each and every animal thus vivisected cannot be demonstrated. On the contrary, there are reasons which compel belief that, in many instances, these vivisections implied the most horrible and prolonged torments that the practice of animal experimentation has ever been permitted to evoke.

What are some of these reasons ?

First. In the work describing these experiments, the author has nowhere asserted that *each animal subjected to experiment was from the beginning to the end so deeply and profoundly under the influence of ether or chloroform as to be totally unconscious of pain.*

Now, the omission of this statement is peculiarly significant. If it had been possible, we may be quite sure that such a statement would have been made. Suppose, for example, that in place of vague generalities the experimenter had said:

> " Before the commencement of each experiment, the animal was deeply anæsthetized by the inhalation of chloroform or ether, or both; and the insensibility thus induced before the experiment began was maintained until the death of the animal. Curare was never used. In no instance and at no time during any experiment was the anæsthesia otherwise than profound; the corneal reflex was never to be obtained, nor was any other sign of sensibility to pain ever to be noted."

A statement like this would have been definite. But with due regard for truth, it could not have been

made. Instead of an explicit statement, we have merely the assertion—so easily misunderstood—that "in all cases the animals were anæsthetized." And this statement may mean nothing whatever, so far as concerns the painlessness of these vivisections.

Second. Great care was apparently taken in some cases to prevent deep anæsthesia.

It is a well-known fact that dogs are peculiarly susceptible to chloroform, and very likely to die while under its influence. The president of the Royal Academy of Medicine in Ireland, a teacher of science for many years, Sir Thornley Stoker, stated in his testimony that a dog's heart is very weak and irregular. "I fear that in the case of dogs, anæsthesia is not always pushed to a sufficient extent, as these animals often die from the effects of the anæsthetic if given to a full extent. . . . *The anæsthesia cannot be complete*, if the dog lives as long as is necessary for some of these experiments."[1]

Now, one of these experiments lasted over three hours, and many of them over an hour. How many of the 148 animals died because the anæsthesia was *too deep?*

On this point the admissions of the experimenter seem especially significant. "*Over-anæsthesia* rendered the animals subject to early collapse, and decidedly less capable of enduring a protracted experiment." During certain experiments, "*considerable care* was necessary to prevent excessive inhalation of the anæsthetic by the animal." And yet all that could happen to the unfortunate victim would be a painless death; to prevent that would require, doubtless, considerable care. "If the

[1] Testimony before Royal Commission, Questions 761, 836.

animals were allowed *partially to recover from the effect of the anæsthetic*, care was necessary in reducing them again to surgical anæsthesia, as an excess of the anæsthetic was liable to be inhaled."[1] This admission is evidence complete, that the insensibility was not always maintained from beginning to end; the creatures were in some cases—how many we can never know—" *allowed partially to recover*."

In the detailed accounts of these vivisections, we find more than one proof of the sensibility of the animals. Take the following:

Experiment 126. "The animal did not take the anæsthetic well, and part of the experiment was made under *incomplete anæsthesia*." There was noted, also, " contraction of the abdominal muscles, on account of *incomplete anæsthesia*."

Experiment 133. " Bunsen's flame to the right paw. . . . In the control experiments, as well as this, *the dog was not under full anæsthesia . . . the animal struggled on application of the flame*."

Experiment 5. " *Under incomplete anæsthesia*, crushing of foot caused a very sharp rise, followed by an equally sharp decline of pressure. *This was repeated several times*. Under full anæsthesia crushing of paws caused rise again."

Experiment 4. " First, crushing of paw. . . . Second, crushed foot extensively, *just before corneal reflex was abolished*."

To the average reader the last few words convey no definite meaning, but their significance is plain. Until the corneal reflex is abolished, the surgeon does not

[1] " Surgical Shock," p. 137.

begin to operate, for sensibility remains. It is needless to quote further; even a single instance of incomplete anæsthesia, admitted by the vivisector himself, suffices to overturn the claim that the insensibility was complete in every case. "Words," says Bishop Butler, "mean what they do mean, and not other things"; and no amount of literary juggling can prove that whether the insensibility is complete or incomplete, the pain is precisely the same.

Third. Curare and morphia, neither of which is an anæsthetic, were sometimes used in these experiments, apparently to prevent the animals undergoing vivisection from making any movements which might disturb the instruments employed.

The use of *curare* rests upon the admission of the vivisector himself. After mentioning the employment of chloroform and ether, as before quoted, he adds: "In a few cases, *curare* and *morphia* were used." Now, these drugs are not anæsthetics, and curare especially is only used when it is desired to keep the vivisected creature incapable of any movement—no matter what degree of torment it may be suffering. In his textbook on physiology, Professor Holmgren calls curare the "most cruel of poisons," because an animal under its influence "it changes instantly into a living corpse which hears and sees, and knows everything, but is unable to move a single muscle; and under its influence no creature can give the faintest indication of its hopeless condition." Dr. Starling, the professor of physiology at University College, London, states that when an animal has had an anæsthetic administered and also a dose of *curare*, if the anæsthetic passed off, the

animal would be unable to move, or to show any sign of suffering.

Nor is morphia an anæsthetic. "So far from suppressing sensibility completely," says Claude Bérnard in his lectures, "morphine sometimes seems to exaggerate it." An animal under its influence "*feels the pain, but has lost the idea of defending himself.*"

We should have been very glad if the author had stated in his book the precise experiments in which curare and morphia were employed. We are told that the number was "few." But in comparison with the total number—146—how many may that phrase signify? Were there twenty? Possibly. It would seem that in every case after the preliminary administration of anæsthetics—the dog's throat was cut, so that artificial respiration could be easily maintained; "tracheotomy was performed," to use the scientific phraseology. This is done when curare is given, for then not the slightest movement of the tortured creature can disturb the delicate instruments which are attached to it. We may therefore assume that every case wherein only curare and morphia were used—how many there were we do not know—implied torment for the wretched victims.

Human beings are not submitted on the surgeons' table to operations of this character, prolonged for hours. If, in the interest of Science, some experimenter would place himself in like condition to that of the animals upon which he worked; if, under anæsthesia—complete or incomplete—he would permit a hand to be "crushed," a nerve trunk "stimulated," his feet placed in boiling water "for a considerable time," and a Bunsen's flame applied for two minutes to some part of his body—we

might possibly learn whether the acutest pains inflicted could be absolutely suppressed. Perhaps he would survive to tell us; but the animal cannot speak. No assurances suffice to clear our doubts; assurances prove nothing. It may be, to use the words of a great surgeon, that "in this relation, there exists a case of cruelty to animals far transcending in its refinement and in its horror, anything that has been known in the history of nations."

Such are some of the reasons which induce doubt of the theory that all of the experiments of these vivisectors were conducted upon animals wholly insensible to painful impressions. To become the victim of the anæsthetic delusion regarding them is to justify; and to justify is to share responsibility. But this is not all. There would seem to be other evidence of the most convincing character, that some of the animals thus subjected for hours to the stimulation of nerves and to the most frightful mutilations were not at all times in such state of unconsciousness as to prevent the occurrence of one most significant indication of pain. It is proof to which the attention of the public, so far as known, has never yet been directed; and I propose to illustrate somewhat at length what has been done in the name of free and unlimited vivisection, not only during the closing years of the past century, but down almost to the present time.

CHAPTER XII

VIVISECTION OF TO-DAY

If the reform of vivisection may only be hoped for, when the secrecy concerning it shall have been dispelled, the beginning of the present century is not propitious of any changes. Against all intrusion upon its rites, the physiological laboratory in England and America maintains as successful an opposition as ever characterized the Eleusinian mysteries of the pagan world. No laboratory—so far as known—dares to invite inspection at any hour, even from men of the highest personal character, and leave them free to reveal or to publicly criticize whatever in the experiments upon animals there conducted seems worthy of caution or reproof. Silence and concealment, so far as the outer world is concerned—these are yet the strange ideals of modern vivisection.

Within the realm of scientific literature, however, this reticence is not maintained. Experiments may be there described in terms so abstruse and technical, that, while clear enough to the professional reader, they convey little or no meaning to the man in the street. There would seem to be a growing tendency to state certain facts in carefully shrouded phraseology, in complete confidence that the full meaning will not be dis-

cerned. Within the past few years, therefore, a large number of vivisections have been described in full—vivisections which half a century ago would have aroused the horror and execration of the English-speaking world—without exciting any very general condemnation beyond the circle of those who ask for reform. Experimentation of this kind, exhibiting the practice as it is carried on to-day, seems worthy of a somewhat careful examination. It will not be necessary to go beyond the work of a single vivisector who has made his name a household word wherever experiments upon animals are discussed in England or America.

The principal point toward which inquiry must be directed is the question of pain. One reason why they have been partly condoned by the public is not difficult to discover. In language which seemed to have no element of ambiguity, the experimenter apparently affirmed the entire absence of sensation on the part of the dogs which he and his assistants subjected to operations of various kinds and of an extreme character. It is true that, as a general rule, this affirmation was not as explicit as might perhaps be desired. He was writing for professional men only, not for the general public, and it is quite unlikely that any physiologist or medical reader could have been at any time misled in the slightest degree. If the language used was capable of more than one interpretation, if possibilities of insensibility were exaggerated into definite assertions, nothing of the kind was apparent to the general reader. Glancing at the statement that "the animals were completely anæsthetized," his doubts were abolished. Indescribably disgusting and hideous

as were some of the vivisections, if they were absolutely painless, their performance was a matter of taste. Can we criticize the humaneness of one who, at the butcher's bench, mutilates the body from which life has gone? Complete and perfect anæsthesia, maintained till death, is practically only premature death. Deprived of sensibility—a deprivation that is never to cease—a living creature is beyond the infliction of cruelty. But is it certain that all these various experiments, made upon nearly five hundred dogs were without pain? Reasons for doubt concerning some of them have been given. Let us now look into the question so far as concerns vivisection in its relation to the pressure of the blood.

A little over two centuries ago the Rev. Stephen Hales, the rector of an obscure country parish in England, became interested in problems pertaining to the circulation of sap in plants, and blood in the higher animals. By various experiments he discovered that the blood in the body of a living animal is subject to a definite pressure, and with some approach to accuracy he succeeded in measuring it. The subject seems to have attracted but little attention for over a century after the discovery of Hales; it was then again investigated by physiologists, and certain conclusions definitely reached. Without going into the subject at length, it suffices to state that this blood-pressure constantly varies slightly, being somewhat influenced by every disturbing condition, and probably by every physiological act. Any injury tending to lower the tone of the general system, or to induce the condition of shock, tends to cause the blood-pressure to fall. On the other

hand, if the animal is sensible to pain, the stimulation of sensory nerves, or any sharp or sudden pang, *tends to cause a rise in the pressure of the blood*, unless the creature has become exhausted by the experimentation to which it has been subjected.

Upon this point the attention of the reader should be specially directed. What authorities support this conclusion ? Only a few need be named, for there would appear to be no difference of opinion among physiologists regarding the fact.

Sir Thomas Lauder Brunton, one of the leading medical writers in England, in a contribution to the latest edition of the "Encyclopædia Britannica," tells us:

"*Irritation of sensory nerves* tends to cause contraction of the bloodvessels, *and to raise the blood-pressure.*" [1]

Dr. Isaac Ott, an American physiologist of distinction, states in a description of certain vivisections made by him:

"*It is a well-known fact that irritation of a sensory nerve* causes an excitation of the vasomotor centre, *which is indexed by a rise of pressure.* . . . As indirect irritation *always produces a rise of pressure,* the sensory nerves and the conductors of their impressions up to the (spinal) cord are not paralyzed." [2]

Dr. Leonard Hill, in an article contributed to Schafer's "Textbook of Physiology" upon the circulation of the blood, says:

"Arterial pressure is affected reflexly *by stimulation of any sensory nerve in the body.* . . . The usual result of stimulating a sensory nerve is *a reflex rise of arterial pressure.*" [3]

[1] Enc. Brit., Art. "Therapeutics," p. 800.
[2] Ott, "On Physiological Action of Thebain," pp. 11-12.
[3] Schafer's "Textbook of Physiology," vol. ii., pp. 166-167.

The writer goes on to explain that when the tone of the system is weakened " after prolonged experiment *or during the administration of chloroform and chloral,*" then a fall of pressure may occur.

This phenomenon was known to physiologists many years ago. For instance, Dr. J. C. Dalton, professor of physiology at the College of Physicians and Surgeons, in his well-known textbook on physiology, says that the most frequent instance of reflex constriction of arteries is that " which follows irritation of the central extremity of a sensitive nerve."

" This effect has been observed by many experimenters, and is regarded as nearly invariable. Galvanization of the central extremity of the sciatic nerve causes general constriction of the bloodvessels throughout other parts of the body, *indicated by increased arterial pressure.* A similar result is produced by the irritation of . . . other sensitive nerves, or nerve roots." [1]

And, referring to another experimenter, Dr. Crile, puts the case clearly:

" *Pain increases (blood)-pressure.* In four cases of trauma (injury), a rise of 20 to 40 was noted upon pressure upon a nerve. Even in a healthy person, pinching the integument was noted to increase the pressure." [2]

It would seem unnecessary to accumulate evidence regarding a physiological phenomenon so long and so firmly established. We may therefore take it for granted that in a living animal or in a human being, as a general rule, the irritation of a sensory nerve will cause a rise of blood-pressure.

Let us now suppose that an animal destined to be

[1] Dalton's " Physiology," pp. 507-508.
[2] Crile " On Blood-Pressure," p. 341.

vivisected lies before us, " stretched " on the vivisection dog-board, so securely fastened that voluntary movement is almost impossible. An incision has been made in the neck, and in the principal artery has been inserted a part of a delicate instrument designed to indicate the fluctuations of the blood-pressure of the animal. The sciatic nerve has been laid bare; the animal is supposed to be under the influence of an anæsthetic continuously administered, and if our imagination is vivid and our faith implicit, we may believe that no suffering will be felt. *But how may we be certain?* This question came up more than once before the Royal Commission on Vivisection. How can one tell that an animal may not be insufficiently anæsthetized *if it can make no sign, when all the acts by which it might evince its suffering are carefully restrained?* The animal which lies before us cannot move; every physical movement is as far as possible totally suppressed. It cannot use its voice, for the trachea is cut and otherwise used. *Are there no means whereby we can tell whether the animal is suffering* what one of the Royal Commissioners called " a nightmare of suffering " ?

The answer to this question has been given by some of the leading physiologists of England.

Dr. J. M. Langley, professor of physiology in the University of Cambridge, a Fellow of the Royal Society, gave explicit testimony on this point. His examiner was desirous of knowing upon what he would depend, other than upon the dose of the anæsthetic and watchfulness, if in the animal he could see nothing that would satisfy him.

" There is the state of the blood-pressure, which would

indicate to some extent the reflexes on the vascular system," Professor Langley replied.

"*Would pain cause an increase of blood-pressure?*"

"*It would cause a rise of blood-pressure,*" replied the physiologist. Of course, he insisted upon the sufficiency of the anæsthesia, but he had made the most important admission which his evidence affords. *If pain were felt, it would cause a rise of blood-pressure.*

Dr. W. E. Dixon of King's College, London, representing one of the sections of the Royal Society of Medicine, gave evidence before the Royal Commission on various matters pertaining to anæsthesia. Dogs, he asserted, "very easily die of chloroform; but if one goes sufficiently slowly they never die." (18,677)[1]

"Supposing you were giving chloroform with *curare*, then it might be said you were not giving enough chloroform. *But you can see whether you are giving enough by looking at the blood-pressure.*" (18,690) Professor Dixon tells us that one of the gauges used for determining whether anæsthesia is present or not *is the blood-pressure.* "The blood-pressure goes *down because the chloroform is given.* The heart beats more feebly; therefore the blood-pressure goes down." (18,742)

Another expert physiologist, whose testimony on this point is enlightening, was Dr. E. H. Starling, professor of physiology at University College, London.

"Are there any means, other than the cries or struggles of the animal, by which you can tell whether the anæsthetic is passing off?"

[1] Figures in parentheses refer to the questions or replies in the printed evidence.

"*Yes, you can tell it by the blood-pressure,*" Dr. Starling replied. "When one is working without curare, one notices *that the pressure goes up*, and then, if one does not attend to it, after that comes a little movement, *and you give more anæsthetic.*" (4,054)

We need not follow Professor Starling in his repeated assurances of complete anæsthesia in his vivisections; all this is merely an expression of faith in the accurate and perfect working of his instruments, a faith which some of the Commissioners did not share. What interests us is the statement that *if the anæsthesia is imperfect, the blood-pressure will reveal it.* "The pressure goes up"; there is some slight motion on the part of the animal; *it feels*, and that returning sensibility to painful impressions is indicated by an increase in the pressure of the blood.[1]

But how is the measurement of the blood-pressure to be ascertained? One of the instruments in use is thus described:

"The pressure exerted upon the blood in the arterial system may be measured by attaching the carotid artery of a living animal to a reservoir of mercury, provided with an upright open tube or pressure-gauge. . . . Under pressure of the blood, the mercury rises in this tube, and the height of the mercurial column becomes an indication of the pressure to which the blood itself is subjected within the artery. The arterial pressure is found to be equal to the average of a column of mercury 150 millimetres, or 6 inches, in height."

Instruments for ascertaining the blood-pressure in human beings record it merely for a moment or two. In experimenting upon a living animal, an incision is made

[1] Sir Victor Horsley admitted that "changes in the blood-pressure" afford an indication whether anæsthesia is perfect or not (Ques. 16,057).

in the neck, the principal artery exposed and severed, and connected with the recording instrument.

"Pain" is a word which as a rule the modern physiologist prefers to exclude from his vocabulary. "We know absolutely nothing about pain except that which we ourselves have suffered," says a leading experimenter. We are unable neither to see, hear, smell, taste, or feel the pain of another being, and although the cries or struggles of an animal which is being vivisected may suggest that it is experiencing intense agony, the physiologist insists that in reality we know nothing about it, and we can only infer that it is experiencing something which our reason suggests that we should feel in its place. Of course we might say the same thing regarding the agony undergone by another human being. What the physiologist does is to note the phenomena following the stimulation of nerves, and to register it by appropriate instruments.

To stimulate a nerve is to excite its activity in some way. When the dentist touches with his instrument the exposed nerve of a tooth, there is immediate "stimulation," as many of us have had reason to assert, even if the dentist can know nothing of our sensations, and can only infer them by remembering his own. One may stimulate the nerve of a vivisected animal by mechanical means, by pinching or scraping it when exposed; and although the movements of the animal may indicate an exquisite sensibility, yet other methods are more effective for the purposes of the experimenter. "Electricity," Professor Austin Flint tells us, "is the best means we have of artificially exciting the nerves. Using electricity, we can regulate with exquisite nicety the

degree of stimulation. *We can excite the nerves long after they have ceased to respond to mechanical irritation.*" A French vivisector, M. de Sinéty, removed the breasts of a female guinea-pig, nursing its young, and laid bare the mammary nerve, and he tells us that " the animal exhibits signs of acute pain, *especially when the nerve is stimulated by an electric current.*" [1]

In 1903 there was published in America an account of a large number of vivisections involving blood-pressure which a well-known experimenter had made, either personally or by his assistants. The number of dogs thus sacrificed was no less than 243; the experiments to which they were subjected amounted to 251. Ether alone was used in 107 experiments, or about 43 per cent. of the whole number; ether and morphia were employed in 80 experiments, or 32 per cent. of the total. Chloroform combined with ether was used but *once.* In no less than 15 per cent. of the experiments no anæsthetic whatever is named, and *curare* was employed in nearly 10 per cent. of the investigations. Why was curare used? We have seen that the professor of physiology in Upsaal University regards it as " the most cruel of poisons." An animal under its influence, Professor Holmgren tells us, " changes instantly into a living corpse, *which hears and sees and knows everything*, but is unable to move a single muscle, and under its influence no creature can give the faintest indication of its hopeless condition." The French vivisector, Claude Bérnard, tells us frankly that death under the influence of this poison " is accompanied by sufferings the most atrocious that the imagination of man can conceive." Precisely the reason why

[1] *Gazette Médicale de Paris*, 1879, p. 593.

this poison was employed in the investigations before us we have no means of knowing by anything the vivisector has stated in his report. He tells us, indeed, that "the animals were all reduced to full surgical anæsthesia before the experiments began, and were killed before recovery from the same." We see no reason for doubting why this may not have been true. It is quite probable that as a rule the preliminary cutting operations necessary were made while the animal was deeply insensible. But was this deep insensibility maintained for hours? Was it so absolute that doubt is impossible? Since it is certain that the irritation produces a rise in blood-pressure, was this phenomenon never witnessed during the terrible operations to which these dogs were subjected for hours at a time? If, as Professor Langley of the University of Cambridge explained, pain "*would cause a rise of blood-pressure*," was this sign of agony ever evoked when the bare nerve was subjected to "stimulation," or the paws "slowly scorched" one after another? Let us see.

We observe that as a rule each vivisection consisted of two procedures, aside from the preliminary operation. In the first place, the normal pressure of the blood was reduced by various methods, calculated to depress the vital powers of the animal, and to induce a condition of collapse, and this was followed by such "stimulation" of nerves as would tend to cause the blood-pressure to rise in an animal not perfectly anæsthetized. The means taken to depress the vital powers were as varied as the ingenuity of the vivisectors could devise. Sometimes it was accomplished by skinning the animal alive, a part of the body at a time, and then roughly "spong-

ing" the denuded surface. Sometimes it was secured by crushing the dog's paws, first one and then the other. Now and then the dog's feet were burnt, or the intestines exposed and roughly manipulated; the tail was crushed, the limbs amputated, the stomach cut out. Then came the "stimulation" of the exposed nerve, carried on and repeated sometimes until Nature refused longer to respond, and death came to the creature's relief. No torments more exquisite were ever perpetrated unless absence of feeling was completely secured. Was it so secured? Let the experimenter's own report give us the facts, remembering that if there was pain, "*the blood-pressure would rise.*"

Experiment 42. The material used was a little dog, weighing only 11 pounds. How it was "reduced to shock"—whether by skinning or crushing—we are not informed; all we know is that it was "reduced to shock." The sciatic nerve was exposed, the artery in the neck laid bare, and the instrument for measuring the blood-pressure carefully adjusted. Ether, we are told, was used. Was all sensibility thereby wholly suppressed? Let us see what is revealed by the changes of the blood-pressure.[1]

"10.30 a.m. Sciatic nerve stimulated. *Slow rise in blood-pressure.*
10.35 a.m. Sciatic nerve stimulated. *Rise of blood-pressure.*
10.51 a.m. Sciatic nerve stimulated. *Rise of blood-pressure.*
11.30 a.m. Sciatic nerve stimulated. *Rise of blood-pressure 13 millimetres.*
11.59 a.m. Sciatic nerve stimulated. *Rise of blood-pressure 5 millimetres.*"

[1] In all experiments cited in this chapter the italics are not in the original descriptions.

Noon has come. It is the hour when experimenters need their accustomed refreshment, and we note a long interval during which there were no observations. The victim lies stretched upon the rack. After nearly two hours the pastime began again, or, we may say, "the young scientists resumed their arduous labours."

"1.55 p.m. Sciatic nerve stimulated. *Abrupt rise of blood-pressure* 17 *millimetres.*
3.3 p.m. Sciatic nerve stimulated. *Rise of* 14 *millimetres.*
4.44 p.m. Sciatic nerve stimulated. *Rise of* 2 *millimetres.*"

The little animal is growing weaker. For more than six hours it has been on the rack. The play upon its nervous system is about over. At five o'clock the dog died.

The full details of this experiment do not here concern us, and are not given. Whether useful or not is another matter. Pain, said Professor Langley, "*would cause a rise of blood-pressure.*" Did not the blood-pressure rise when this creature's nerve was stimulated ?

Experiment 114. In this experiment four dogs were simultaneously vivisected. Some of them lasted but a short time; but one—a young dog—was "in splendid condition," and subserved the object of the vivisection for many hours. The usual incisions were made in the trachea and carotid artery, and the femoral vein and sciatic nerve was exposed. At 10.59 a.m. the blood-pressure was found to be 125 millimetres; at 10.42 it had been reduced to 99 millimetres—by what means we are not informed. Further details are as follows:

"11.42 a.m. Blood-pressure 99 millimetres.
11.45 a.m. Stimulated sciatic nerve. *Pressure rose to 115 millimetres.*
12 midday. Blood-pressure 95. Sciatic nerve stimulated: *blood-pressure* 115.
12.19 p.m. Blood-pressure 92.
1.23 p.m. Blood-pressure 108; sciatic nerve stimulated.
1.26 p.m. Blood-pressure 110; three minutes later."

Between 1.29 p.m. and 2.19 p.m. there is no record of any observations. Perhaps we may venture the hypothesis that during this period of nearly an hour's duration, the young experimenters went out to luncheon. The dog, while stretched upon the rack, could have had no other refreshment than cessation from the stimulation of its nerves.

But after about an hour's intermission the young vivisectors would seem again to have begun their observations concerning the effect produced by stimulating the sciatic nerve. What was that effect? It appears to have been very uniform.

"2.28 p.m. Sciatic nerve stimulated. *Abrupt rise and fall in blood-pressure.*
3.32 p.m. Sciatic nerve stimulated. *Rise and fall in blood-pressure.*
4.16 p.m. Sciatic nerve stimulated. *Blood-pressure rose to* 120, falling to 105.
4.34 p.m. Sciatic nerve stimulated. *Abrupt rise* and fall of blood-pressure.
4.53 p.m. Sciatic nerve stimulated. *The usual rise and fall followed.*"

Do we find in the last observation an indication of a growing distaste for such work? One cannot tell. Between 5.49 p.m. and 6.36 p.m. there are no observations recorded. Perhaps this period of forty-seven minutes—three-quarters of an hour—were devoted by

the young vivisectors to the conviviality of their evening repast. Then the usual observations were renewed. But at 7.10 p.m., while again " stimulating the sciatic nerve," suddenly the dog's heart stopped. At 7.12 p.m. " the dog died." During a period from eleven o'clock in the forenoon until after seven o'clock in the evening—*eight hours and thirteen minutes*—the little animal had been stretched upon the rack. Its " splendid condition " had enabled it to survive the tortures to which its three less vigorous companions in martyrdom had long before succumbed, and had made it possible for many hours to play upon exquisite sensibility.

" *Pain,*" said Professor Langley to the Royal Commissioners, " *would cause a rise in blood-pressure.*"

Was there not repeatedly a rise of blood-pressure in this experiment? We call attention to no other details.

Let us study these vivisections further. When animals were subjected to injuries calculated to make the strongest impression upon their sensibility, was not the response *a rise in blood-pressure?*

Experiment 38. A small female spaniel, weighing about 13 pounds. Ether is said to have been used for anæsthesia.

" 12.54 p.m. Blood-pressure 98 millimetres.
1.11 p.m. *Hind-foot burned. The blood-pressure rose rapidly to* 118 *millimetres.* A slow fall followed.
1.42 p.m. *The foot was burned. A sharp rise in blood-pressure followed.*"

The dog died of heart failure, after an experience of nearly five hours in the hands of the vivisectors.

Experiment 73. A dog, weighing about 15 pounds.

Morphia and ether said to have been used. Did they prevent sensation under such "stimulation" as follows:

"*Application of the Bunsen flame to the foot for four seconds was followed by a decided rise in the blood-pressure.* . . . The blood-pressure was maintained higher *by repeated burnings.*" These are the final words of the report of this experiment. We do not know when the dog died, nor to how many burnings he was subjected.

The use of fire as a method of "*stimulation*" of nerves seems to have been very attractive. For example:

Experiment 74. Dog. "*Gradual burning of the left hind-foot produced a very marked rise* (of blood-pressure). *The rise was maintained by slowly scorching the paws. After the effect began to wear out in one paw, another was stimulated in a similar manner, so that the blood-pressure was maintained for twenty minutes.*"

Of what possible value was such an experiment? Does any one believe that in a human being blood-pressure will ever be maintained by slowly scorching the hands and feet of the patient?

Experiment 75. Small dog, weighing about 13 pounds. Morphia and ether said to have been used. During this experiment the intestines were exposed and manipulated, and the foot and tail "*crushed.*" "*The left hind-foot was burned; a rise in the blood-pressure followed.*"

Experiment 96. Dog. *No anæsthetic mentioned.* Artificial respiration. "*Burning hind-paw produced a rise in blood-pressure.*" After administration of *curare*, there was another "*burning of the paw*," the blood-pressure did not respond, and shortly after, the dog died.

Experiment 95. Dog, in good condition. *No anæsthetic mentioned.* Integument removed from three-fourths of the body. "*Burning of the hind-paw. Abrupt rise* (of blood-pressure), 55 *millimetres*, then an equal fall. The denuded surfaces were roughly sponged for a considerable time." Then *curare* was given, and artificial respiration followed.

Experiment 46. Mongrel; good condition. An excessive amount of ether given at beginning; artificial respiration became necessary. Extensive operations were made, such as crushing the paws, breaking the legs, and manipulating the nerve trunks. These were followed by *a rise in blood-pressure.*

Experiment 104. *No anæsthetic named.* Dog.

"11.26 a.m. Animal reduced to surgical shock by skinning, and mechanically irritating the raw surface.
11.36 a.m. CURARE given.
11.58 a.m. Electrical stimulation of sciatic (nerve). *Rise of blood-pressure.*
12.48 p.m. Sciatic nerve stimulated. *Rise of blood-pressure.*
1.12 p.m. Electrical stimulation of sciatic nerve caused a *rise . . . in blood-pressure.*
2.40 p.m. Animal died."

When Dr. Francis Gotch, F.R.S., the professor of physiology in the University of Oxford, was examined before the late Royal Commission on Vivisection, he testified that under curare an animal could not even blink an eye, so complete is the immobility produced by this drug. Yet to the eye of the experimenter would there not be something to tell him whether or not the animal was feeling pain?

"I should say so," replied the physiologist—"in the alterations of blood-pressure."

"*It is a rise of blood-pressure*, is it not?" inquired one of the Commissioners.

"*Yes*," was the physiologist's curt reply.

"But it would be diminished if the animal was absolutely anæsthetized?"

"*Yes*," was the reply of Dr. Gotch.

"Is a change in blood-pressure the only mode by which you can objectively determine whether the animal is conscious, or suffering pain, if under the influence of curare?" somewhat later, the physiologist was asked.

"I suggest that *that is one obvious way*."

Let us turn again to the experiment just quoted. No anæsthetic is mentioned. Curare was administered, the sole effect of which is to render the living animal as motionless as a corpse. Three times the great nerve was electrically "stimulated," and each time there was that *rise of blood-pressure* which we are told upon the highest authority was the "*one obvious way*" of determining the presence of pain.

Keeping in mind this testimony of the professors of physiology at the Universities of Oxford, of Cambridge, and of London, that if pain were present during a vivisection *it would cause a rise of the blood-pressure*, let us now examine a little more carefully some of the experiments referred to in the volume reviewed in the previous chapter. We have had assurances of their painlessness. But to the scientific man assurances are of little value as compared with the testimony of the instrument. Were any of these experiments associated with a "*rise in blood-pressure*"? It is unnecessary to study them in their relation to other phenomena. In the early "stimulations of a nerve trunk, a rise in blood-pressure

was always produced"; but after a number of repetitions the time came when no effect was produced, or the pressure fell; the point of exhaustion had been reached. But let us note what the instrument recorded. The italics are ours.

Experiment 5. "Under incomplete anæsthesia, *crushing of foot caused a very sharp rise,* followed by an equally sharp decline of pressure. This was repeated several times." (The author also tells us that "under full anæsthesia, crushing of the paws" caused a rise. One may question the completeness of the insensibility.)

Experiment 8. Fox terrier, two years old; ether. . . . *Crushing of the paw was attended by immediate rise.* . . . Crushing of the fore-leg *was attended by a rise.* . . . Crushing of the foot, *attended by a rise.* Cutting skin of thigh and leg was *attended by a rise.*

Experiment 9. "*Crushing of the paw was followed by a rise,* and continual cutting and crushing of the paw *by a still further rise of pressure.*"

Experiment 17. Several loops of intestines were withdrawn and placed *in boiling water, attended by a rapid rise* of the blood-pressure, followed soon by a fall.

Experiment 28. Hip-joint amputation made on both sides caused a rise in pressure. *Grasping sciatic nerve with forceps* and *making traction* (pulling upon the nerve) *caused a rise.*

Experiment 36. Small white dog. . . . *Hot water* introduced into abdominal cavity *produced a rise.*

Experiment 59. Spaniel, female; weight only 13 pounds. It has "been nursing its puppies," and is very cross. Duration of experiment, one and a half hours. Manipulation of ovaries caused slight *rise of blood-pressure.*

Experiment 76. Dog. Among other procedures, the vivisectors "*applied a large gas-flame* to the posterior extremities in the region of the knee; a slight rise. Repeated the application for a longer time; slight rise. . . . *Application of a Bunsen flame to the nose, producing a slight rise in blood-pressure.*"

Experiment 82. A small female dog; weight only 9 pounds. Time of experiment, one hour and fifty-five minutes. "One-third of a grain of *curare* and one-twelfth of a grain of morphia

were injected into the jugular vein." After various manipulations, there was "*application of Bunsen's flame to the right hind-foot,*" causing "*an appreciable rise in the blood-pressure.*"

Experiment 87. Dog. Time of experiment, two hours and forty-five minutes. "Injected *curare* and morphine into the jugular vein; artificial respiration maintained. . . . The sciatic nerve was exposed and stimulated by a faradic current. *A sharp increase in blood-pressure* during the period of stimulation was noted." [1]

Experiment 94. "Electrical stimulation of sciatic nerve produced *marked increase in blood-pressure.* . . . Application of Bunsen's flame to the foot; *rise in blood-pressure.* . . . *Repeated application of Bunsen's flame for a period of two minutes produced decided rise in blood-pressure.*"

Experiment 95. "Application of Bunsen's flame to the paw produced but slight rise. . . . Bunsen's flame applied to the foot, *causing rise in both pressures.* . . . Application of *Bunsen's flame now produced a sharp rise in the pressures.*" Then the blood-pressure fell, and though the vivisector applied flame to the intestines, it produced no effect so far as the blood-pressure was concerned.

Experiment 97. "Application of *a Bunsen's flame produced the characteristic increase in blood-pressure.* . . . Stimulation of the sciatic nerve by the faradic current produced an *increase in blood-pressure.* . . . Repetition of the stimulus produced *a further rise in blood-pressure.* . . ."

Experiment 110. "Application of Bunsen's flame *produced a sharp rise.* . . ."

Experiment 113. "Bunsen's flame applied to the posterior and anterior extremities *produced a marked rise in pressure.* . . . *Bunsen's flame over region of the heart produced a gradual rise.*"

Experiment 131. "Bunsen's flame to the right hind-foot was followed by *a rather marked rise in central blood-pressure.*"

Experiment 132. "*Bunsen's flame to the nose caused a general rise in blood-pressure.*"

In the year 1900 the same vivisector published an account of certain experiments on the respiratory

[1] Concerning the rise of blood-pressure as the sign of an animal's sensibility to painful impressions, when under the influence of *curare*, see testimony of Professor Gotch of Oxford University, quoted on a preceding page.

system, 102 in all. We have the usual assurances of anæsthesia, which, of course, can only be regarded as the operator's opinion. Fire is an element of some of these experiments. We are told that "a large blow-flame burner used for glass-blowing supplied a flame that could be adjusted to a very great range of intensity." Of this statement one can have no doubt upon reading some of the experiments described. Upon "a healthy little poodle," weighing only ten pounds, with a blood-pressure of 120 millimetres, the following experiment was made:

"The mouth was held wide open, and *the blow-flame directed into the pharynx and respiratory track.* The immediate effect upon the blood-pressure was *a temporary rise.* Again the flame was applied; *the blood-pressure rose to* 204 *millimetres, continuing at this high rate for some time.*"

Probably this little creature was the pet of some child. From whose door, one day, did it wander, to be snatched up by some thief, sold to a laboratory, and sent to a death like this?

In another experiment a Newfoundland dog "*continuously breathed the flame for twelve minutes.*" In a similar experiment that followed, "the results were practically identical. In this case *the flame was so intense as to melt the adipose tissue around the trachea.*" The animal was broiled alive.

During the first year of the twentieth century the same writer presented the public an account of an "Experimental and Clinical Research into Certain Problems," a work containing a considerable number of experiments of a nature similar to those before published. We are again told that in all cases "the animals were anæsthetized, usually by ether, occasionally by

chloroform," alone or combined with other substances, although, in a few cases, "*curare* and morphine were used"—neither of which is an anæsthetic. A curious statement seems to imply a confession that all these experiments were not absolutely painless, for the writer says:

"Every precaution was taken to inflict *as little pain or distress as possible.*"

Is not this an admission that in some experiments there was pain? How senseless is such statement! When Ridley and Latimer were burnt alive at Oxford, the executioner might have protested with equal assurance that "every precaution was taken to burn the condemned with as little pain and distress as possible."

Between the experiments recorded in this volume and those which have been reviewed, there is no very great difference. There is a rise of blood-pressure after any mutilation or stimulation calculated to cause pain, except in the few cases where a sufficiency of the anæsthetic appears to have been given; to these attention will be called. A new procedure seems to have been the use of the injection of a hot salt solution into the blood. Some of the results of experiments were as follows:

Experiment 12. "Burning right hind-foot caused a slight *rise in blood-pressure.*

"Ten minims (drops) of chloroform on inhaler produced *a decided fall* in blood-pressure."

Experiment 56. "Dog. Hind-foot burned, *followed by a rise in blood-pressure.* . . . Burning the nose caused *a very marked rise* in blood-pressure. The animal, after the injection of cocaine, *was not under full ether anæsthesia, conjunctival reflex being present.*"

Experiment 27. "Dog. Ether anæsthesia. Hind-foot was burned, producing *a sharp rise* in the blood-pressure.

"Right paw again burned, and *arterial pressure rose.* . . . Animal subjected to *further burning,* which was followed by *additional slight rise in pressure.*"

A considerable number of experiments involved the adding of hot salt solution to the blood.

Experiment 34. Dog, in good condition. Saline solution in jugular vein. . . . In this and in preceding experiments with the hot saline, the animal, *though under surgical anæsthesia, struggled.*

That shows the worth of the "surgical anæsthesia." When Professor Starling was asked how he might know that the anæsthesia was passing off, he told the Royal Commission that it was by noting the *slight movement* of the animal, *in conjunction with a rise of blood-pressure.*[1] Scalding water in the blood seems to have given both of these signs:

Experiment 11. At 3.35 saline at 64° C. (this is 147° F.). *The dog struggled somewhat.* The blood-pressure *rose markedly.*

3.45. Saline in jugular vein. Slight fall, then a quite *abrupt rise* in blood-pressure. . . . *The dog again struggled vigorously.*

3.48. Saline at 60° C. (140° F.). Slight *rise* in blood-pressure. *Dog struggled somewhat.*

3.54. Saline at 60° C. An immediate *rise* in blood-pressure.

4.12. One-half drachm of chloroform on inhaler.

4.13. *Marked fall* in blood-pressure.

4.13. *Chloroform taken away. Blood-pressure immediately arose* to previous level.

Experiment 32. A few drops of chloroform were given instead of ether, the *blood-pressure falling* immediately. . . . After a few minutes, several drops of chloroform were again administered, a marked *fall* (of blood-pressure) following.

[1] Evidence before Royal Commission, Question 4,054.

One-half drachm of chloroform given, *producing a gradual fall in blood-pressure.* On removing the chloroform, the blood-pressure recovered.

At 5.30, saline stopped. Eye reflex not gone. At 5.36 *the anæsthesia removed. Slight rise* in blood-pressure. *Reflexes not abolished.*

Does all this seem obscure to the reader? At all events, he can see that the effect of even a "few drops of chloroform" is a fall of the blood-pressure, and that when the "anæsthesia is removed" there comes the rise which is so constantly associated with sensibility.

Some of the experiments related to the effect of cocaine in "blocking" sensation. These effects have long been known; the necessity of all this burning of flesh is not apparent.

In another experiment, a large dog was reduced to "surgical anæsthesia," and both sciatic nerves exposed. In one nerve cocaine was injected, in the other salt solution.

The cocaine paw was subjected to burning by a Bunsen flame, *until the paw was charred.* There was no effect on the blood-pressure. But on applying the Bunsen flame to the other paw, "*there was a deliberate drawing up of the leg, as if to remove the paw from the flame.*" The writer tells us elsewhere that "under general anæsthesia—no matter how deep—if the paw of an animal is subjected to the flame of a Bunsen's burner, after the lapse of a short time, the leg is drawn up . . . in a deliberate but rather forceful manner, removing the foot from the flame." When cocaine is injected into a nerve trunk, we are told that an effectual physiologic "block" is produced. The difference is manifest. Yet the vivisector would

have us believe that in all cases of his "anæsthesia" the dog is unconscious. May it not be rather that there are phases of agony so great that the anæsthesia of the laboratory does not suppress them? Is this a matter of uncertainty? Then why not permit the vivisected dog to have the benefit of the doubt?

Here is a most significant experiment:

Experiment 17. ". . . The animal was allowed to come out of the influence of the general anæsthetic sufficient (*sic*) to make a slight struggle. . . . *The feet were burned* just previous to the application of cocaine, and . . . *blood-pressure was increased.* More cocaine was then applied; *the animal became totally anæsthetized, the corneal reflexes were abolished,* and on applying a Bunsen flame to the paws, *no effect was produced.*"

Here we have an instance of a dog allowed to come out of the influence of the anæsthetic and to struggle; the feet burned; and finally, such a degree of total anæsthetization as to prevent the usual phenomena. But why are we told that "the animal became *totally anæsthetized,* and that the corneal reflexes were abolished"? Is it a confession that in other experiments such a state of deep insensibility was not invariably produced?

What is the necessity for all this burning? The smell of scorched and charred living flesh may have hung as heavily in the laboratory of the hospital as before the altars of Baal; it could hardly have been an attractive savour. Here are other instances:

Experiment 62. "Dog, in good condition; fox-terrier. As a control, *the right hind-foot was burned before the conjunctival reflex was abolished.* There was *rise in blood-pressure.*"

Here, then, was sensation; the eye responded to the touch.

Experiment 72. Dog; weight 12 pounds. (Spinal) cord exposed.

5.5. Burning foot was followed *by rise in blood-pressure.*

5.10. Burning foot. "*A rise in blood-pressure followed.*"

Cocaine was then injected, and burning of paws "produced no effect." There was a difference in the phenomena produced.

In the year 1909 the same vivisector published still another volume recording experiments upon hæmorrhage and the transfusion of blood. To many of these experiments we should take no exception on the ground of inutility or excessive production of pain. Others, however, are to be criticized, particularly when studied in connection with the claim put forth of complete absence of animal sensation. In his introduction the experimenter seems to assert in the most distinct and emphatic way the complete unconsciousness of each victim. He says:

"No experiment was performed in which the particular animal used was not reduced to complete insensibility by means of ether, or some other equally efficient anæsthetic. If the statement is made that the anæsthetic was stopped during an experiment, it does not mean that the animal could suffer pain, but that death was threatened from too much anæsthetic, more being given as soon as signs of revival were shown. In every experiment in which necessary mutilation was performed, the animal was killed before coming out of the anæsthetic; therefore absolutely no suffering was undergone. Very few recovery experiments were performed, no more than were necessary to prove a given fact."

What is the scientific value of this assurance—that "absolutely no suffering was undergone"?

It can have no value, except as an opinion on the part of one extremely interested in the maintenance of a particular view. So far from being a series of painless

experiments, we do not hesitate to suggest that *if rise of blood-pressure be a sign of pain*, then, in all probability, many of them involved torments as exquisite as it is possible to imagine.

Take, for example, the following vivisections:

Experiment 10. The subject was a dog, said to be in a good condition. From time to time blood was abstracted from the body.

4.26. *On burning a paw under light anæsthesia, there was a rise of pressure of* 16 *millimetres.*

10.16. On burning a paw, there was *a rise of pressure.*

11.13. On burning a paw, there was *a rise of pressure* of 13 millimetres.

1.42. On burning a paw, there was *a rise of pressure* of 13 millimetres.

Experiment 33. "*On burning a paw under light anæsthesia, there was a rise of pressure of* 19 *millimetres.*"

What is "*light* anæsthesia"?

It is a condition which a few drops of chloroform will produce; a state in which the loss of consciousness is so slight that any pain may be as keenly felt as if no stupefying agent had been given. What are we to think of a statement that in a condition of such light slumber the keenest of pains—*the burning of living flesh—involved no suffering?* How can one speak with authority on a matter like this against the evidence of the "one obvious sign" of sensibility? When the paws of the miserable animal were burned, was there not the rise of blood-pressure which indicated suffering? "Pain would cause a rise of blood-pressure," said the professor of physiology of the University of Cambridge. Should we find this significant rise of the blood-pressure in other experiments

where fire was used for the "stimulation" of the nerves? Let us see.

Experiment 2. "On burning a paw, there was a *rise of pressure of* 10 millimetres. Stimulation of sciatic nerve resulted in *a rise* of systolic pressure."

Experiment 4. "11.45. On burning a paw, there was *a rise of pressure.*

"1.27. Sciatic nerve stimulated; *rise of blood-pressure.*"

Experiment 6. "Burned a paw. *A rise of pressure* of 4 millimetres resulted."

Experiment 12. "On burning a paw, there was a *rise of pressure* of 16 millimetres."

Experiment 14. "On burning a paw, *a rise of* 12 *millimetres,* followed by a temporary fall, and then a rise to a higher level.

"On burning a paw, there was *a rise of blood-pressure of* 2 *millimetres.*"

Experiment 15. "11.12. On burning a paw, there was *a rise of pressure of* 8 *millimetres.*

"11.36. On burning a paw, there was *a rise of pressure of* 12 *millimetres.*"

Experiment 16. "Dog. Condition good.

"11.22. On burning a paw, there was *a rise of pressure of* 22 *millimetres.*

"11.33. On burning a paw, there was *a rise of* 29 *millimetres.*

"11.44. Control. On burning a paw, there was *a rise of* 24 *millimetres.*

"12.26. On burning a paw, there was *a rise of pressure of* 8 *millimetres.*

"12.35. On burning a paw, there was *a steady rise of pressure.*"

Experiment 22. "Dog. On burning a paw, there was *a rise in pressure of* 36 *millimetres.*"

Experiment 24. "On burning a paw, there was *a rise of blood-pressure of* 12 *millimetres.*

"12.19. On burning a paw, there was *a rise of pressure of* 18 *millimetres.*"

Experiment 29. "2.13. Blood-pressure 43. On burning a paw it rose 12 millimetres.
"2.30. On burning a paw, *there was a rise of blood-pressure.*
"3.6. On burning a paw, *there was a rise of blood-pressure.*"

Experiment 31. "3.35. On burning a paw, *there was a rise of pressure.*
"4.14. On burning a paw, *there was a rise of pressure.*"

The foregoing experiments are not quoted in full; in many of them, at intervals, the animals were bled; and these observations of the effect of " burning a paw " were incidental to others. *But why all this burning and stimulation to prove a phenomenon so uniform?*

One exceptional experiment must not be overlooked. On one occasion two dogs were vivisected at the same time. At the outset, a paw of each dog was burned, causing *a rise* of blood-pressure in each case. A little later the sciatic nerve was stimulated:

" 11.25. On stimulating the sciatic nerves of each dog, Dog A showed a rising and falling pressure, and Dog B (*more ether was given just then*) showed an initial *fall*, and a rise, with a sudden second *fall* and a rise.

" 11.32. *Both dogs were deeply anæsthetized.* Dog A: Stimulation *produced no effect.* Dog B: On stimulating the sciatic nerve, there was *a fall of (blood)-pressure, with slow recovery.*"

Here we have recorded by the experimenter himself the difference in the effect of stimulation of nerves in an animal " deeply anæsthetized " and the results produced when the anæsthesia was light.

It has seemed necessary to examine at some length these peculiar experiments. The volumes describing them are not easily to be seen; some appear to be out of

print; even Sir Victor Horsley, in whose laboratory in London some of the experiments were performed, confessed that he did not know about the vivisections made in the United States—whether or not they differed from those performed in England. In the vast number of these vivisections, so far beyond anything previously reported in our country by a single experimenter; in the ingenuity and variety of the mutilations to which the victims were subjected—mutilations and stimulations calculated to cause the extremest agony, unless the anæsthesia was perfect; in the seeming affirmation of absolute insensibility of the wretched animals, although contradicted by the only sign of suffering that in some cases could possibly be seen; in the apparent uselessness of experiments, repeated again and again simply to elicit precisely the same phenomena; above all, in the absence from criticism which some of these "investigations" have managed to secure—all this constitutes a claim for especial consideration. There can be little doubt that they merely illustrate what goes on to-day, in many a laboratory in the United States, in secret—as these were made in secret—and untouched by the criticism of the outer world.

Of the absolute uselessness of the vast majority of these experiments much might be said, but it is aside from this inquiry. The question of utility is not here raised. The one matter of inquiry is the existence of pain.

If a vast number of the experiments recorded may have involved the keenest agony of the victims, how are we to explain the repeated assertions that sensation was absolutely removed? Among antivivisectionists

there are those who believe that any human being who could thus subject animals to torment would not find it impossible to deny the fact. Such explanation implies an inveracity which it is not necessary to impute. Mankind is still liable to error; the false deductions of honest men have more than once led to mistaken affirmations of facts; and the most illustrious scientist that ever lived can hardly claim infallibility in matters of opinion. A distinguished philosopher and vivisector of three hundred years ago, Rene Descartes, put forth the theory that animals, being without souls, cannot suffer pain, and that their cries under vivisection were simply as the whirring of wheels in an intricate piece of machinery. We can easily imagine a modern follower of Descartes declaring, as the philosopher would have done, that "*no suffering was felt.*" A professor of physiology in Harvard Medical School, in course of an address before a State medical society, laid down the theory that "it is *entirely impossible* to draw conclusions with regard to the sensations of animals by an effort to imagine what our own would be under similar circumstances"; and when a vivisector has reached the stage where he can hold that belief, he may define pain as something pertaining only to human beings, and feel himself justified in declaring that "*vivisection of animals never causes pain,*" according to his definition of the word. It is well for the world that with this theory the vast majority of thinking men and women have no sympathy whatever. The organized efforts for the protection of animals from cruelty have no meaning if animals are without capacity for that anguish which cruelty implies. We believe, on the contrary, that

many, if not all, of the higher species of animals, especially those nearest to man in structure and intelligence, receive, when subjected to the torment of fire or steel, precisely the same sensations that, under a like infliction, a human being would suffer. At any rate, if doubt be possible, should they not have the benefit of it?

If one were asked whether he surely could demonstrate the emotions of any animal made incapable of movement, fixed immovably as in a vice, and subjected to the stimulation of fire, he might confess that inference and not proof was all he could offer. But if one goes farther, and inquires whether in any of the experiments recorded in this chapter there was evoked any sign of sensibility which delicate instruments could detect and record, then, assuredly, we are on safe ground. With startling uniformity we find recorded by the experimenters themselves the fluctuations of blood-pressure following the stimulation of exposed nerves, the crushing of paws, the burning of the feet, the scalding with boiling water, and other mutilations. What is their significance? If, as Sir Lauder Brunton tells us, "the irritation of sensory nerves tends to cause contraction of bloodvessels *and to raise the blood-pressure*"; if, as Straus affirms, "*pain increases blood-pressure*," so that in a healthy person the pressure is increased even by pinching of the skin; if, as the physiologist Dalton declares, the irritation of any of the sensitive nerves induces a constriction of bloodvessels indicated by increased arterial pressure; if the professor of physiology at University College, London, being asked if there were any means, other than the cries or struggles

of an animal, by which one could tell if the anæsthesia of an animal was passing off, answered with scientific accuracy when he replied, "You can tell by the blood-pressure," adding that when sensibility was returning "*the pressure goes up*"; if it be true, as Professor Dixon, of King's College, London, told the Royal Commissioners, "you can see whether you are giving enough (of the anæsthetic) *by looking at the blood-pressure*"; if the professor of physiology at Oxford was correct in stating that "*a rise of blood-pressure*" would tell an experimenter whether or not an animal undergoing vivisection was feeling pain, even though curare had rendered it so helpless that it could not even wink an eye, and that this rise of blood-pressure was the "*one obvious way*" of determining such sensibility; if we may depend upon the evidence of the professor of physiology at the University of Cambridge, that "*pain would cause a rise of blood-pressure*"; if the agreement of all these scientific authorities concerning the rise of blood-pressure as an indication of pain or returning sensibility can be accepted as scientific truth—then may we not be sure that all of the living animals whose vivisection we have here reviewed, in whose bodies, by fire and steel and every phase of mutilation, there was so constantly elicited this *rise of blood-pressure*, cannot be said to have attained a painless death? "A man about to be burned under a railway car begs somebody to kill him, yet it is a statement to be taken literally, that a brief death by burning would be considered a happy release by a human being undergoing the experiences of some of the animals that slowly die in a laboratory." So wrote Dr. Bigelow of Harvard University, the most

eminent surgeon that New England has yet produced; and were he living to-day, it is not improbable that he would point to some of the experiments here reviewed as examples of the vivisections he intended to condemn. It may be that although the present generation be indifferent, posterity will not condone, and that one day it will hold up some of the experiments of the twentieth century as involving the most prolonged, the most useless, the most terrible, the most cruel torments, that the annals of animal vivisection have ever supplied.

CHAPTER XIII

WHAT IS VIVISECTION REFORM ?

EVERY reflecting man must recognize that the settlement of the vivisection question is a problem that must find its solution at some period in future rather than to-day. But the duty of the hour remains the same. Admitting the existence of the wrong, what can we do to promote reform ? What should we ask with the hope that popular judgment will gradually come to approve ? How may we be faithful to that ideal of justice toward our inferior brethren, which underlies all humanitarian effort, and lack nothing in fidelity to Science to whose achievements we reverently look for the amelioration of the human race ? There are those who would oppose the slightest use of animals for any scientific purpose whatever. There are others who would grant to the vivisector the secrecy and silence, the complete irresponsibility and unbounded freedom which he demands as his right. There are those to whom a middle course seems the only one leading to ultimate reform. What is the most reasonable attitude toward the laboratory and its claims possible to an honest and clear-minded investigator who is anxious to protect all living creatures from cruel acts, and equally concerned in the conservation of every legitimate privilege which Science can claim ?

Such a man stands, let us say, before some great biological laboratory, richly endowed, splendidly equipped, and in the present enjoyment of freedom that is without bounds, and in a secrecy that to-day is as complete as can be imagined. What can he learn with certainty of what goes on within? If he hears claims of superlative gains by the experiments there carried on, how is he to weigh and decide their value? If there is cruelty behind those barred doors, how is he to prevent its constant recurrence? What, in short, should be the reasonable attitude of every intelligent man or woman anxious to know the truth and to promote reform of abuse?

For many years I have insisted upon the necessity for a certain degree of scepticism regarding every claim put forth by the laboratory, unsupported by convincing proofs. We may judge the future by the past. Has there not been evinced a disposition to exaggerate achievement, to deny secrecy, to mislead regarding the infliction of pain? No intelligent person, it seems to me, can study the evidence carefully, year after year, without reaching this attitude of distrust and doubt in a great number of instances. This by no means indicates that every claim of utility is false. A great many statements are accurate. Some claims will be partly true, but magnified by the enthusiasm of youth far beyond what devotion to a strict veracity would require. And some claims may be doubted altogether. It may be doubted whether any reliance whatever can be placed upon the assertions or protesting denials of any professional vivisector now drawing a large income from the vivisection of

animals, whose interests would possibly be affected by failure to produce startling results, or by removal of the secrecy that now enshrouds the laboratory. The defenders of absolute licence have not told us the truth on every occasion it has been sought from them, and it must be gained from other sources and by other means.

It would seem, therefore, that the first step toward reform must be the creation of a public sentiment, eager, not so much to pass condemnation as to know the facts. That the laboratory, of its own accord and initiative, will ever open its doors and give to the world a complete knowledge of what goes on within its sacred precincts, is more than we can expect. The doors will open only when public opinion so demands. The laboratory is perfectly aware of this. With every energy that such consciousness gives, it will fight to keep everything that it now hides from the light of day. Take, for example, the question of vivisection in our institutions of learning. To what extent is experimentation carried on therein merely to demonstrate what every student knows in advance? It would appear that certain lines of experiment are now permitted in such institutions which hardly more than a generation ago were condemned as cruel by the medical profession of Great Britain. We ought to inquire why it is that experiments which scarcely thirty years ago were thus condemned, are less abhorrent to-day. The removal of secrecy is the first and most important step toward any true reform.

It is the fashion of certain apologists for vivisection without control to represent their opponents as guided

by sentiment alone. Perhaps it would be well to quote the opinions of one whose work for science should absolve him from that imputation.

One of the most illustrious philosophers which America has produced was Dr. William James, professor of psychology in Harvard University. In that institution, thirty-five years ago, he was assistant-professor of physiology, and knew exactly what was done. Harvard made him a professor of philosophy, and then of psychology; Princeton and Oxford and Harvard conferred upon him their highest honours. He lectured both at the University of Oxford and the University of Edinburgh. He was a member of various scientific societies in France, in Germany, in Denmark, and England. If any man was entitled by experience and study to speak with some authority concerning vivisection, it was William James of Harvard University.

He knew to what extent the practice of vivisection was carried on. Calling upon me one day in Cambridge, we compared views, and although he told me of certain experiments he proposed to make the next day, he was emphatic in his denunciation of the atrocities which over and over again were repeated in physiological laboratories throughout the land. The men who raised their voices against all reform were—he said—neither candid, nor honest, nor sincere.

Somewhat later, with some knowledge of his views, he was asked to hold an honorary relation to the Vivisection Reform Society. His reply was so characteristic of the man that it is here given :

"DEAR SIR,

"I am made of too unorganizable stuff to be a Vice-President of the Vivisection Reform Society, and, moreover, I make it a principle not to let my name appear anywhere where I am not doing practical work. But I am glad to send you, in answer to your request, a statement of my views, which you are at liberty to publish if you see fit.

"Much of the talk against vivisection is, in my opinion, as idiotic as the talk in defence of it is uncandid; but your Society (if I rightly understand its policy) aims not at abolishing vivisection, but at regulating it ethically. *Against any regulation whatever* I understand the various medical and scientific defenders of vivisection to protest. Their invariable contention, implied or expressed, is that it is no one's business what happens to an animal so long as the individual who is handling it can plead that to increase Science is his aim.

"This contention seems to me to flatly contradict the best conscience of our time. The rights of the helpless—even though they be brutes—must be protected by those who have superior power. The individual vivisector must be held responsible to some authority which he fears. The medical and scientific men, who time and time again have raised their voices in opposition to all legal projects of regulation, *know as well as anyone else* does the unspeakable possibilities of callousness, wantonness, and meanness of human nature, and their unanimity is the best example I know of the power of club opinion to quell independence of mind. No well-organized sect or corporation of men can ever be trusted to be truthful or moral when under fire from the outside. In this case, *the watchword is to deny every alleged fact stoutly;* to concede no point of principle, and to stand firmly on the right of the individual experimenter. His being 'scientific' must, in the eye of the law, be a sufficient guarantee that he can do no wrong."

It may be questioned whether more serious charges against the laboratory have ever been made than are contained in these statements by an expert in vivisection. The man of the world wonders at the unanimity of scientific writers of the day in opposing every step tending to reform. Professor James tells us it is due to

"the power of club opinion to quell independence of mind." That the professional vivisectors as a body "*cannot be trusted to be truthful when attacked,*" that they combine "to deny every alleged fact stoutly," these are the admissions of an expert experimenter, whose record as a man of science is surely equal if not superior to that of any vivisector in America.

Professor James believed that some abuses had been rectified. He says:

"That less wrong is done now than formerly is, I hope, true. There is probably a somewhat heightened sense of responsibility. There are, perhaps, fewer lecture-room repetitions of ancient vivisections, supposed to help out the professors' dulness with their brilliancy, and to 'demonstrate' what not six of the students are near enough to see, and what all had better take, as in the end they have to, upon trust. The waste of animal life is very likely lessened, the thought for animal pain less shamefaced in the laboratories than it was. These benefits we certainly owe to the antivivisection agitation, which, in the absence of producing actual State regulation, has gradually induced some sense of public accountability in physiologists, and made them regulate their several individual selves.

"But how infinitely more wisely and economically would these results have come if the physiologists as a body had met public opinion half-way long ago, agreed that the situation was a genuinely ethical one, and that their corporate responsibility was involved, and had given up the preposterous claim that every scientist has an unlimited right to vivisect, for the amount or mode of which no man, not even a colleague, can call him to account.[1]

[1] "Unnecessary and offensive in the highest degree would it be, . . . by legislation of any kind, to attempt to dictate or control how, and by whom, and for what purposes, and under what conditions and upon what animals in the laboratories, . . . experiments should be made. The decision in these matters *should be left wholly to those in charge of these institutions.*"—*From a memorial of Dr. Simon Flexner, Dr. W. T. Councilman, Dr. H. C. Ernst, and other members of the Association of American Physicians against Senate Bill regulating vivisection in the District of Columbia, May* 4, 1896.

"The fear of State rules and inspectors on the part of the investigators is, I think, well founded; they would probably mean either stupid interference or become a sham. But the public demand for regulation rests on a perfectly sound ethical principle, the denial of which by the scientists speaks ill for either their moral sense or their political ability. So long as the physiologists disclaim corporate responsibility, formulate no code of vivisectional ethics for laboratories to post up and enforce, appoint no censors, pass no votes of condemnation or exclusion, propose of themselves no law, so long must the antivivisection agitation, with all its expensiveness, idiocy, bad temper, untruth, and vexatiousness, continue, as the only possible means of bringing home to the careless or callous individual experimenter the fact that the sufferings of *his* animals are somebody else's business as well as his own, and that there is 'a God in Israel' to whom he owes account.

"WILLIAM JAMES.

"CAMBRIDGE, MASS.,
"*May* 5 (1909)."

This is a very strong indictment. If he misunderstood the antivivisectionists, we must remember that Henry Clay in 1851 could see nothing good in William Lloyd Garrison and the Abolition party. But James knew precisely what the vivisection of animals meant, for he had taught physiology, and had been engaged in experimentation for more than a quarter of a century. When he speaks of the power of "club opinion to quell independence of mind," he explains a situation which otherwise might remain obscure. When he asserts that certain groups "cannot be trusted to be truthful or moral," we have the explanation of a philosopher who was not given to over-statement.

Do we find in this letter an outline of what Professor James would suggest as steps toward vivisection reform? In perfunctory inspection of laboratories or supervision by State inspectors, he has no confidence;

such inspection would probably degenerate into a sham. A well-known experimenter once said to the writer: "Your inspectors of laboratories must be either well-educated and competent men, or else officials of the grade of the average policemen. If they belong to the first class, do you think they will become detectives and spies? If, on the other hand, they earn the salary of the average policeman, will they be intelligent enough to discover abuses, and invariably of such rectitude that a ten-dollar bill will not induce official blindness?"

It would seem that this objection to State inspection cannot be lightly considered. For the prevention of cruelty it may be right to permit certain persons always to have the right to enter any laboratory whatever without previous notice; the fact that they may come at any time constitutes the safeguard to a limited degree. But such men must be persons unpaid by the State, of intelligence sufficient to comprehend all peculiarities of experimentation, and of a probity that no bribe can disturb. It would be far better to allow things to go on as they are than to have cruelty protected by public confidence in a legal supervision that did not sufficiently supervise and restrain.

It appears to me, as I have said elsewhere, that first of all public opinion should be aroused, not so much to condemn all experimentation upon animals, as to know with certainty the facts about it. Of the vivisection of animals in England and America carried on in secret, the general public, even of the more intelligent class, has no more accurate information than two centuries ago it had of the methods of the Spanish Inquisition in the dungeons of Madrid or Seville. How

did it happen that an institution so execrated and so universally condemned to-day, managed for centuries, almost unchallenged, to exist? Precisely as the closed laboratory manages to exist among us, because of the secrecy in which it was surrounded, and the general confidence which it claimed as its due. Reform cannot make headway so long as the dungeon is dark and the laboratory is locked. The strongest line of defence is the maintenance of ignorance, even though we have the curious anomaly, existing nowhere else, of Science covering herself with darkness and hiding behind ignorance. It was one of the ablest advocates for vivisection that America has produced, who, in an address before the American Academy of Medicine, condemned the secrecy of the physiological laboratory as "a grave and profound mistake," adding that "if there be necessary secrecy, there is wrong." No more significant condemnation of present-day methods has ever been uttered.

An eminent London physician, Dr. Greville Macdonald, wrote not long ago in favour of that publicity of vivisection, or rather of that knowledge of its methods which should precede any attempt at legislation. The question of interference is one that the State must decide, though the dangers and advantages of vivisection can only be arrayed in intelligible order by one who understands the subject. "But the public, *having heard the evidence*, must decide whether or no the State shall more willingly sanction cruelty in the secret laboratory than in the highway. . . . I most reluctantly admit, it is almost impossible to get evidence upon such points, and for the reason *that the things which we fear*

are practised in secret places. Nevertheless, it is just because of this secrecy that the public have a right to make trouble. But for John Howard's crusade against the horrors of the prisons, the public had never known the truth, their infamies had never been remedied; and the public have now as much right to question the physiologist's repudiations as they had then to doubt the denials of the gaolers. The evidence is sufficient to justify, in my own mind, a large measure of sympathy with the antivivisectionists, though I am not of them."

What lines of procedure in the direction of reform would Dr. Macdonald advocate? He admits that "to prohibit vivisection altogether would be to invite its performance in such secrecy as no system of espionage could unearth. Legislation can seldom do more than compromise, because it cannot essay the impossible." He admits that "no Act of Parliament can eradicate the spirit that makes cruelty possible." But there are some things that may be done, and upon four points Dr. Macdonald believes legislation is desirable. "The first is that vivisection ought to be prohibited for purposes of teaching, because it is often misleading and always demoralizing. The second is that the inspection of the physiological laboratories should be carried out more systematically and always unexpectedly, and that the inspectors should largely be increased in number. Thirdly, I would prohibit all dissections, with or without anæsthetics, upon live horses and dogs. Fourthly, I would make the administration of curare for purposes of experiments a criminal act."

One method of obtaining information concerning the practice in America is through a Legislative commission.

Guided intelligently, such a Commission should be able to present in its final report a large accumulation of important facts. It is evident, however, that if such disclosures are likely to tell against present methods of research, the appointment of any such Commission will be strenuously opposed by everyone connected with the laboratories. The strange thing is that precisely this opposition has been evinced in the State of New York, as elsewhere shown. The powers that control prefer the present darkness, and for the time being have been able to secure it. But this very opposition is so significant that no effort should be relaxed to bring every phase of the practice of vivisection into the light of day.

That altogether too much reliance may be placed upon Government inspection of laboratories seems unquestionable. If one could be sure that it would always be conducted by intelligent and educated men, with due appreciation of scientific aims, yet in thorough sympathy with humane motives and objects, it would undoubtedly be of use. But no such reliance can be ours. The experience of England should convey a lesson in this respect.

Suppose, therefore, that in place of demanding the State inspection of laboratories, or any present interference with the conduct of the vivisector, we endeavour first of all to learn the facts through the experimenters themselves. Of course they will not volunteer any information that may seem to tell against the practice; we must expect the laboratory to put forward every obstacle that might hinder the facts from becoming public if there is anything wrong to hide. But unless

the claim be soberly put forth—and I am not sure that this may not be the case—that the vivisector has a right to work in complete secrecy, and to hide his methods from the world, he cannot complain at being the reporter of his own activities.

Assuming then, that our object be solely the acquisition of knowledge without interference until necessity be shown, what can be done by legislation in America to attain the end desired?

1. *The Registration of Laboratories.*—Every place where experiments upon animals are to be legally made should be licensed by the State. It has been suggested that such regulation should recognize the occasional necessity for experiments upon animals relating to the transmission of diseases at other places than laboratories, as, for example, on farms. A liberal recognition of all genuine exceptions might easily be made; the only object of such regulation is to insure that all experimentation whatever comes upon the record. So long as this is accomplished, every exceptional case of such investigation outside a laboratory may easily be permitted without injury to the principle involved.

2. *Registration of Experimenters.*—Every man who desires to perform experiments upon animals should be required to obtain a licence from the State granting such privilege for a definite time. This could work no injury to science in America, for in England it has been a rule in force for many years. When one remembers that a physician or surgeon, even though possessed of the greatest skill, cannot practise unless licensed by the State, it is difficult to see why a practice so liable to abuse and cruelty should be

without this simple recognition of the experimenter's ability, humaneness, and skill.

3. *Reports of Experiments.*—We are sometimes told that if there is any secrecy in vivisection, it is only that which scientific men everywhere demand for scientific work. The dissecting-room has its enforced privacy; the chemist must have his period of uninterrupted attention, and to the observatory of the astronomer it is not easy to obtain admittance at any and all times. Suppose Society to grant the privacy for a time, asking in return from every registered laboratory and from every experimenter, the completest reports of all experiments upon animals. What objection can be raised if there is nothing to conceal? The Savings Bank, the Insurance Company, even the National Treasury, are all required to give at regular intervals information concerning the disposition of funds. Let us place the creatures liable to vivisection and taken into a laboratory on a plane of equal importance with bags of silver coin taken into a banking-house. From great financial institutions we require detailed information and reports attested by oath concerning the disposition made of money taken into its treasury. No cashier would dream of objecting to such reports; they are the tribute which conscious integrity unhesitatingly pays to secure public confidence and trust. Now, in the interests of science—which means always truth demonstrated, not truth concealed—and in the interests of humanity as well, let us ask for every material fact pertaining to the creatures entering a laboratory for vivisection, whether it be the dog, " stolen, to begin with " (to use the phrase

of the London *Lancet*), or animals more legitimately acquired, so long as their lives are to be exploited in the professed interests of mankind.

In every registered laboratory, therefore, the law should require that a register be kept concerning every animal of the higher species brought upon the premises for purposes of experimentation. The species of every such animal, its sex, colour, condition, and apparent age; from whom it was acquired and the price paid for it; and to whom for experimentation it was finally delivered—all these facts should be a part of the permanent record of every laboratory. It ought not to be difficult to devise a register, which at the outset would probably meet the suggested requirements.[1]

One advantage of such a register as this would be the assistance it would render in all attempts to trace animals which are stolen or lost, and which find their way to the laboratory. Every animal which may possibly have been a pet should be kept for redemption for two or three weeks, and no animal should be purchased unless the purchaser is able to have a record of the address of the seller. Anyone can distinguish between a homeless vagabond of the street and an animal which must have been well treated in a good home, and I believe that experimentation upon a pet animal under any conditions should be forbidden by law.

The gain arising from such registration is obvious. It would mark the entrance within the laboratory of every creature intended for experimentation of any kind. It makes possible to an extent the tracing of pet animals,

[1] See Appendix, pp. 340-343.

lost or stolen, which now find themselves devoted to vivisection. The inspection of such a register should be permitted to any person whatever endeavouring to trace a lost or stolen pet. A summary should be regularly furnished for publication, attested by oath, precisely as the cashier of a national bank periodically attests the accuracy of his reports. Such a report is but a promulgation of facts which ought to be within the reach of the public. By no stretch of imagination can one honestly declare that such knowledge will constitute an impediment to justifiable research. Yet no one acquainted with this subject can doubt that every resource of the laboratory will be brought forward to resist to the uttermost even the giving of so little information as this.

But we must go beyond this. To trace animals to the door of the laboratory, and there to drop them, leaves the curtain unlifted; they enter the darkness, and that darkness must be dispelled. It must be the privilege of the public to know as completely as possible *exactly what is done after they pass the door*. How is this to be accomplished? How may we know what is done to the animals thus traced to the door of every laboratory without being charged with impeding the legitimate researches of science? For reasons stated, inspection will not accomplish it. As carried out in England, it certainly has accomplished but little for the protection of animals. The published reports of experiments made in that country under one or another "certificate," are practically of no value whatever except to show the constant increase of such experiments every year. The plummet must sink to deeper depths. If Society is to grant to the physiological laboratory that isolation and

freedom from interference which it craves, *then Society has the right to ask in return the completest disclosure that can be given of methods and results.*

It has the right. Unfortunately it cannot persuade or compel. That is the province of Legislation.

Vivisection, we must always remember, is an exceedingly complex practice. It is a means of demonstrating well-known facts; it is also a method of original research. How many animals in any given laboratory are used in each of these phases of experimentation? No one can tell us. If the laboratory keeps no account, it is unlikely that the information could be given by anybody else. A strong impression exists that "original research" for any object of conceivable utility to mankind is vastly more infrequent than vivisection for the repetition—painful or otherwise—of facts perfectly well known. We need to have the question settled with an accuracy upon which as much reliance may be placed as upon the oath of the cashier of a bank. "Every laboratory," said Dr. George M. Gould, in an address before the American Academy of Medicine, "should publish an annual statement setting forth plainly the number and kind of experiments, the objects aimed at, and, most definitely, the methods of conducting them." This wise suggestion, however, bore no fruit. No such "annual statement" has ever been issued by any American laboratory, so far as I am aware. Even if thus issued it would not go far enough. Such reports should be attested under oath by each individual experimenter, exactly as the officers of a bank are required by law to make reports regarding its financial standing. Every experimenter should therefore be

required to state what he has done during the three preceding months; to give the number of animals of each species which have been delivered to him, the object of each experiment, and the cases in which curare was employed. Especially should a careful distinction be drawn between original investigations made in private and experiments made before students or by students themselves, solely for the illustration of well-known facts. An outline of a report that would cover these facts will be found in the appendix.

And yet this is hardly enough. It is not sufficient to have the results of individual experience; we should have a summary of all experimental work made upon the higher animals in each laboratory given us by the responsible head of that institution. An outline of a report that would give us the information desired is not difficult to devise.[1]

There is little doubt but that violent objection will be made to any such reports. But in the opinion of very many persons the truth about a vivisection laboratory is quite as desirable as the truth about a country bank. Verification in either case implies the same. It would mean that the statement was not made carelessly, but with a due appreciation of the solemnity of an oath. Any gross misstatement on the part of a bank cashier would almost certainly subject him to a rigid examination, and to the penalty of dismissal. It should be the same with a laboratory. If gross misstatements should be made with apparent design to hide something that should have been made known, it seems to me that those who thus offend should have their licences suspended or

[1] See Appendix.

revoked. We cannot forget that Society is here dealing with a peculiar institution, where secrecy is regarded as a virtue. If one could imagine a bank or an insurance company, where every official or employee, from the president down to the scrub-woman, was seeking in every way to keep its affairs hidden from the general public, we should in one respect have the counterpart of the physiological laboratory of to-day.

On the other hand, when the law asks for the truth, whether it be of a bank or a laboratory, under penalties for concealment that cannot be easily disregarded, we may be very certain that in the vast majority of instances compliance will be accorded to its demands. Instances of attempted concealment will, of course, occur; the cashier who has speculated with the funds of the bank will endeavour to conceal his crime, and the vivisector who has carried his private experiments or his demonstrations before students to cruel and unwarrantable lengths will seek by all possible means to prevent revelation of his transgression. In both cases there will be occasional success. But as regards vivisection, it cannot be questioned that whenever in future the law makes a demand for such reports as are here outlined, a vast amount of information, now carefully concealed from the possibility of public judgment, will become known. We shall obtain it, too, without crossing the threshold of a single laboratory, without hindering in any way whatever the least important investigation of a single scientific inquirer.

Ought we not to go beyond this and require reports to state the facts regarding anæsthetics? Eventually such information should undoubtedly be required. So

far as the immediate present is concerned, it would seem perhaps the wiser course not to complicate the inquiry in this way. There are vivisectors who would declare that "anæsthetics are always used" when ether or chloroform has been given in quantity and in time absolutely insufficient to secure for the vivisected animal immunity from pain. Sometimes we shall ask how many animals and of what species are subjected to mutilations and observations that last for days and weeks, and how many, if any, have had "nerves torn out by the roots," as one American physiologist connected with a medical school tells us he has repeatedly done. Into the thousand and one phases of experimentation Society must one day make inquiry. But may it not be best to wait till some knowledge of the leading facts are secured? A report regarding anæsthesia might be utterly useless, except to keep hidden the very facts we wish to know. What some of these facts are may be indicated hereafter, but it would seem best not to include them in any present demand.

What may we conceive will be the attitude of the laboratory interests toward any attempt to secure information concerning the practice, not by State inspection, but by and through reports made by themselves? If the popular conception of physiological investigation were true, should we not be sure of the hearty approval of all physiologists regarding any measure so calculated to remove misunderstanding and distrust? Here would be the wished-for opportunity to demonstrate the vast importance of the problems pursued, and the wonderful results attained compared with the small cost of animal life, the humane and ever-

present solicitude of the experimenter, the immunity from suffering. Here, too, we should have that "organized, systematic, and absolute frankness" in regard to the practice of vivisection, for which one of its greatest American defenders once appealed. But, on the other hand, suppose that the laboratory in England and America dare not permit the whole truth to be known? Suppose that it would not willingly permit the general public to know even the number of animals which are now sacrificed in the demonstration of well-known facts? Then assuredly the laboratory interests will unite to prevent any legislation that could tend to destroy the secrecy that now exists, or to bring the facts of vivisection to the light of day. Which hypothesis is the true one, some day will reveal. We shall then discover whether the laboratory will yield to a demand for publicity, or whether, contending for continued secrecy, faithless to Science, it will resist every attempt to make known the whole truth, and cling to the ideals and traditions of the Spanish Inquisition of three hundred years ago.

CHAPTER XIV

THE WORK OF REFORM SOCIETIES

It is necessary to make a distinction between societies aiming to destroy animal experimentation, root and branch, and those which hope only to prevent abuses and cruelties. Antivivisection societies have been organized in different States. Of their activities it is not necessary here to speak. But another kind of organization has made its appearance, societies aiming solely at the prevention of abuse and the restriction of the practice within limits compatible with humane ideals.

The first society in America organized for the express purpose of prevention of cruelty in animal experimentation appears to have been the American Antivivisection Society, founded at Philadelphia in 1883. The object of the society, as defined by its first charter, was "the restriction of the practice of vivisection within proper limits, and the prevention of the injudicious and needless infliction of suffering upon animals under the pretence of medical or scientific research." To Mrs. Caroline Earle White of Philadelphia, more than to any other, was due the credit of bringing this first society of protest into being over thirty years ago.

It was believed by the founders of this society that the medical profession—so many members of which had

recognized the reality of the abuses and the necessity of reform—would join in some common endeavour to restrict and to regulate the practice. But attempts in direction of any legislation met with decided opposition from the principal laboratories in the State, and although a few physicians of eminence lent their influence to the promotion of reform, the great body of medical practitioners stood aloof. And gradually the founders of the society came to believe that their position was wrong; that the policy of concession and compromise ought to be abandoned, and that instead of asking that any experimentation be legalized, the society should demand the total abolition of all experiments upon living animals.

At a meeting held in 1887 a resolution was brought forward favouring the change of the name of the society and the aim which hitherto they had had in view. Opposition merely to experiments of a painful character was not sufficient; from that time forward every phase of experimentation was equally to be condemned. The resolution was carried. And now for more than a quarter of a century the society has striven to influence public sentiment in favour of its ideal, the total suppression of all scientific experiment upon living animals, whether painful or otherwise. It is needless to say that they have done this in the face of innumerable obstacles, and doubtless with a recognition of the impossibility of present success. Three times they have introduced into the Legislature of the State of Pennsylvania a Bill for some restriction of animal experimentation, and always without avail.

Other antivivisection societies in different parts of the country, adopting the same ideal, were organized

shortly afterward. So far as legislation is concerned, their efforts have met with uniform failure. They have succeeded, however, in keeping the subject before the world in making known the abuses of the practice and voicing a condemnation of its cruelties wherever discerned. I have elsewhere expressed the opinion that, even if their ideals are beyond present possibility of attainment, the constant, persistent, and unwearied protest of these societies against the cruelties and abuses of vivisection have helped, more than anything else, to keep the question a living issue.

In 1896 was organized the first society having for its object solely the repression of abuse, the American Society for the Regulation of Vivisection. Its object was distinctly stated in its title, and its work was confined almost entirely to the publication of literature. In 1903 the Vivisection Reform Society, organized to advance the same moderate views, was incorporated under United States laws, and the earlier society became merged therein. The president was Dr. David H. Cochran of Brooklyn, a distinguished educator, and the secretary, upon whose shoulders fell nearly all the work of the organization, was Sydney Richmond Taber, Esq., a member of the legal profession. Among its supporters were Cardinal Gibbons, Professor Goldwin Smith, Senator Gallinger, Professor John Bascom, ex-President of the University of Wisconsin, Professor William James of Harvard University, and men of standing and influence in the medical and legal professions. For several years its work was carried on with efficiency and enthusiasm, chiefly by the propaganda of the press. It has always seemed to me that

the name of the society was especially felicitous, for it expressed tersely the object of the organization, not the abolition of all scientific utilization of animal life, but the repression and elimination of abuse. A year or two later there was incorporated at Washington the National Society for the Humane Regulation of Vivisection, the objects of which were identical with those of the earlier societies. For many reasons it did not appear expedient to keep in activity two societies with precisely the same objects, and into the new organization the Vivisection Reform Society was finally merged.

Another American society which has done particularly good work is the *Vivisection Investigation League* of New York. The object of this association is fairly expressed by its name; it seeks to investigate the practice, so far as inquiry is practicable, and to make known from the writings of experimenters themselves exactly what is done in the name of scientific research. In this direction the *League* has already done work of exceptional value and interest.

An organization which more than any other has distinguished itself for persistent, unwearied, and vigorous attempts to secure reform by legal enactment is the *Society for the Prevention of Abuse in Animal Experimentation*, organized in Brooklyn, New York, in 1907.[1] From the first it repudiated the suggestion that it was opposed to scientific experimentation upon animals under all circumstances; it has never denied that

[1] To the discriminating and energetic work of Frederic P. Bellamy, Esq., the counsel of the society, and of Mrs. William Vanamee, the secretary, the success of this society is particularly indebted. In the public journals, on many occasions, they have definitely and comprehensively outlined the aims of the organization, and in this respect there has been no excuse whatever for any misunderstanding or misstatement.

some benefits have accrued through animal experimentation, even though such benefits have been exaggerated, but it has bent all its energies toward securing such legislation in the State of New York as should limit the practice to competent men, place it under such legal control, render its abuse a misdemeanour, and all unnecessary and wanton cruelty a legal offence. Bills were therefore introduced for the appointment of a Commission of inquiry regarding the extent and nature of the practice at each annual session of the Legislature. Some of these Bills were reported out of the Committee, and one reached debate in the Senate. But investigation of the practice was precisely what the supporters of the modern laboratory do not seem to desire. They were strong enough to influence the Legislature against such inquiry, and their attempts to open the laboratory have so far failed. Will it be possible for ever to maintain this secrecy ? That is the question for the future.

In its early efforts to secure investigation an attempt was made by this society to secure the co-operation of members of the medical profession, and in union with a large number of persons belonging to various professions over seven hundred physicians in the State of New York signed a petition in 1907-08 in favour of a measure that would have tended to elicit the facts. As soon as the Medical Society of the State of New York became aware of this endorsement, it sent out to each of these physicians a request that he would withdraw his name. What Dr. William James called " the power of club influence to quell independence of mind " could hardly have been more significantly exercised, yet less than forty signers were willing to accede to such demand.

Upon the files of the society are now the signatures of over six hundred physicians in the State who have favoured legislation restricting the practice of vivisection to competent men, and providing against cruelty and abuse.

In the fall of 1911 the Society circulated a petition throughout the State. It asked the Legislature of the State of New York to provide—

"an immediate and impartial investigation by a non-partisan commission into the practice of animal experimentation as conducted in this State. In view of the inherent possibility of cruelty in the practice, and the obvious inadequacy of the existing laws to prevent such cruelty, we deem the existing status of vivisection in this State to be a menace to the community, which calls for legislative investigation."

To this petition more than twelve thousand signatures were obtained. Again the influence of the laboratory was effective in preventing the Legislature from granting the investigation desired.

Some of the most scholarly editorials which have appeared in the newspaper press in favour of inquiry have been those of Hon. St. Clair McKelway, the Chancellor of the Board of Regents of the State of New York and editor of the Brooklyn *Eagle*, the leading evening newspaper in the United States. Referring to one of the Bills introduced by the Society for the Prevention of Abuse in Animal Experimentation, Dr. McKelway said:

"The Bill ought to be passed. It would secure an unpaid representative Commission to investigate animal vivisection, protecting it from abuses, and allowing it to be properly pursued within safeguards of necessity and mercy. . . . The regulation of vivisection is not the abolition of it, but the civilization of it.

Such of the medical profession as are a Trade Union on a large scale, as afraid of one another as they are deaf to the voices of humanity and to public opinion, should be forced by the State to courses that should long ago have been volunteered by themselves. The beginning of the end of licensed cruelty has come. The struggle may still take time, but the time will be well spent and the result is as certain as the triumph of every other benign movement for the Kingdom of God in the hearts of men and in the laws of the State."

Of another Bill introduced by this society, Chancellor McKelway wrote:

"The Society for the Prevention of Abuse in Animal Experimentation necessarily has an awkwardly long name; necessarily, to state just what the Society is, and to show just what it is not. It is not to prevent animal experimentation, but only to prevent the abuse of it. It is not an antivivisection body, but it is a body to control the work of vivisection within the confines of actual necessity, and to bring the work under accountability to law as affected by a relation to reason, to humanity, and to the mercy which is mightiest in the mighty, and which becomes a State more than its sovereignty, and a monarch more than his crown.

"The Legislature again has before it a Bill to bring animal experimentation, or the infliction of pain on animals, in the interest of the treatment of human beings, within law and under responsibility to law. Not for the first time is this Bill brought. It will be brought again and again until the Bill becomes law. The instinct of mercy and justice backs this measure and annually augments its supporters. That instinct will not become extinct until God abdicates or creation reverts to chaos. The movement is on the gaining hand. Doubt of its eventual and nearing success is unthinkable, for in its favour are all the forces that maintain and advance justice and mercy in the hearts of men and in the action of States.

"State-regulated vivisection should be differentiated from antivivisection or from no vivisection, just as civilized and necessary war should be from the impossible abolition of all war. Between regulation and prohibition is a difference. Between responsibility and wantonness is a difference. Yet regulated

vivisection has been confounded with antivivisection by the union of zany cranks and trade-unionized men of medicine, who have not refrained from the coercion of patients, from the deception of the public, from the inoculation of legislators with mendacity, capsuled in sophistry, and from the direct or indirect corruption or intimidation of not a few public journals. The discovery of the ways and means and men is bringing the evil to an end.

"That discovery coincides with the arousal of the public conscience against political corruption, party corruption, and interparty as well as intraparty bribery and tyranny. There is accord between all the forces for betterment. Barbarism and cruelty toward the brute creation are as certainly doomed as polygamy and human slavery were. The needs of surgery will be preserved from wanton slaughter in the name of surgery, in times past, and now wrought by men called doctors and by cub-boys called students. The statesmen in politics are realizing this. The demagogues and opportunists in Legislatures are, too. So are the men of mercy, conscience, and vision in medicine itself. The impact of banded pretension in trade-unionized medical schools and societies is resented and resisted by teachers and practitioners, who are becoming ashamed not to be free, and who are abetting those who would free them.

"There is a good time coming around the whole circle of uplift. The time will not be long coming; but when it shall come, its duration will have no end, and its progress will be perpetual." [1]

It is an interesting fact that the American Society for the Prevention of Cruelty to Animals, founded by Henry Bergh, the first organization of its kind in America, joined in the demand for further investigation. Under the heading, "The Facts Demanded," the editor of its periodical makes known its position regarding vivisection:

"The above caption defines the attitude of the Society to-day toward the practice of 'animal experimentation.' In the com-

[1] Editorial, *Brooklyn Eagle*, April 4, 1910.

mon phrase, 'we want to know,' and we are not to be deterred from what we believe to be a duty by being told from sources more or less reputable that it is none of our business. For many years this Society has been the chief representative in this country and in this city of that large class among our people who feel and cherish an interest in and a sense of humanity for what are called the 'dumb animals.' One great life—that of the founder, Henry Bergh—was spent in this service, and prematurely sacrificed in his devotion to these interests. With faults and failures to reach his ideal, with stumbles and falls, freely admitted, but with a persistent purpose to attain it in the end, this Society has never faltered in its effort to follow the path where he had blazed the way. It has never been seriously accused of acting from fear or favour or from other than altruistic motives, and by so doing it has gained and kept the confidence and respect of a great part of what is best in our community. It is far too late in the day for any newspaper or any group of citizens, no matter how influential in the one case or highly respected in the other, to say to this Society: 'You shall not do the work for which you were chartered, and which for forty-five years you have performed in this community.'

"Now, what is that work in the present instance? Expressed in its simplest terms, it is a demand that the practice of animal experimentation shall be investigated by the State to determine what is actually being done, and that thereafter legislation shall be had that shall place it under such supervision and restriction as shall insure differentiation between scientific investigation performed for wise and adequate ends and purposes on the one hand, and on the other acts of a painful and brutal character performed from unworthy motives, with no adequate benefit possible as a resultant, and which clearly come within the classification of cruelty.

"We submit that this is an eminently fair proposal, and one that should not be opposed by any friend of scientific work, and least of all by the physicians of this city. Yet what do we find? The attitude of that profession is clearly shown by the letter of Mr. Bergh, which we reproduce in our columns, and which will unquestionably receive credence from its frankness and from the eminent name attached to it, now borne by a worthy and devoted descendant of our first president.

"The attitude of the medical profession on this subject is this: 'We know what we are about.' 'We practice vivisection for wise purposes.' 'We surround it with as humane conditions as the object sought will permit.' 'We have made great and beneficial discoveries by its means.' 'We assert that we control it within the above limits.' 'But we will not state what we do, or how.' 'We will not permit our assertions to be verified if we can help it.' 'We will oppose any movement in the Press or the Legislature looking to this end.' 'And we will encourage the Press to defeat such an effort, not only by ridicule and irony but by a definite misrepresentation of the motives and views of the Society that seeks "to know."'

"We do not at this moment question the truth of the assertions as to practice and control which we have put (accurately, we think) into the mouths of the medical profession; but it is startlingly evident that these assertions can only apply *to that part of animal experimentation which they practice or control.* What of the other part? Will those who champion unrestricted, uninvestigated, unsuperintended vivisection assert that they will guarantee to the people of this city that no act of cruelty or wantonness is or ever shall be committed here by a medical practitioner under the guise of scientific investigation? Will they guarantee that such acts are not, and never shall be, committed in this State? Will they guarantee the humanity and the practice of the thousands of medical students who annually graduate from the colleges? Will they enter into bonds to the community for the acts of those who, from time to time, they expel, for cause from the medical societies? Will they place their own great reputations and highly esteemed characters behind, and as vouchers for, many a practitioner with whom they would not meet in consultation, and whom they would not allow to practice or malpractice in the house of a friend or a patient? We think not—we *know* they would not, for such endorsements and guarantees would be impossible of fulfilment. And if they will not and cannot, they should cease to stand between the society that seeks 'to know' and the evils it seeks to expose and eliminate.

"Gentlemen of the medical profession, understand once for all that this Society does not seek to abolish vivisection. It recognizes the good, the great good, that has and that may come

to the human race from its careful, humane, and scientific use. But it aims to abolish its *abuses*, and in that aim it is entitled to your advice and co-operation."

Enough has been given to indicate the purpose of the present movement for vivisection reform. It is not the same as antivivisection, and although it has been persistently misrepresented as such by the advocates of unrestricted freedom in the physiological laboratory, perhaps we have no reason to expect from that quarter any other course. Yet in expressing appreciation both of purpose and accomplishment, it may perhaps be well to suggest a single caution. The time is probably coming when those who have most persistently opposed all appeals for more light concerning vivisection will announce willingness to accede to the public demand, provided the vivisector may himself appoint the investigators, and define the limitations of the inquiry. It needs but little discernment to foresee that an inquiry so conducted may be no better than a farce, and conduce to no real change in the present obscurity. To be of any value the commission of inquiry regarding vivisection must be so intelligent regarding all phases of the practice that it shall know how to penetrate to hidden recesses, where things not desired to be revealed shall be concealed; capable, too, of distinguishing between the work of the expert scientist and that of the ignorant and careless student, untouched, it may be, by any sense of pity or compassion for the creature in its power. The greatest cruelties may yet be found, not in the laboratory of the investigator, but in that of the demonstrator of well-known facts. Perhaps no investigation of the practice of vivisection can be expected until public opinion

shall have been educated to demand it, and then, in point of thoroughness, let us trust it may leave nothing to be desired. Meantime the work of agitation for reform must continue; no matter how slight the accomplishment, surely something is done. "All work," said Carlyle, "is as seed sown; it grows and spreads, *and sows itself anew*, and so in endless palingenesia lives and works."

CHAPTER XV

UNFAIR METHODS OF CONTROVERSY

One phase of the vivisection controversy is of singular significance. It is the peculiar tendency to unfairness which the advocates of unrestricted experimentation seem to display in every discussion regarding the practice. In all controversy there is something to be said on both sides of the question, yet it would seem to be impossible for anyone writing in advocacy of unlimited and unrestricted vivisection to state fairly the views to which he is opposed. Statements, the inaccuracy of which may easily be ascertained, are again and again repeated, until it would almost seem that upon reiteration of error and untruth a certain degree of dependence has been placed for the creation of prejudice against reform.

To demonstrate the truth of such a charge would require a volume. Let it here suffice to mention a few instances of what may at least be termed an unfairness in controversy. Partly, of course, it is the result of ignorance, and of imperfect acquaintance with the past history of vivisection; partly it is due to that enthusiasm of youth which sometimes prefers a seeming victory to any close fidelity to truth. Other instances cannot be thus explained. Some of them are worth considera-

tion as problems for which no solution is easily to be found.

In January, 1913, a Bill was introduced into the New York Legislature providing for an inquiry into the practice of animal experimentation. There was no suggestion of any restriction of vivisection; it was simply an attempt to get at the real facts concerning the practice as now carried on. If it be assumed that no objectionable practices exist, it would seem difficult to oppose such inquiry upon any reasonable grounds. It might possibly have been expected that the Laboratory would welcome the opportunity to demonstrate to the general public that nothing deserving censure could be found to exist.

For reasons not difficult to understand, the proposal to investigate the laboratory and its methods has been resisted quite as strongly as if it had been an attempt to prohibit experiments altogether. To justify rejection of inquiry would not appear to be an easy task. To create a sentiment of approval of the policy of secrecy it doubtless seemed necessary to make an appeal to the general public by editorial utterances, in journals supposed to be impartial and of high standing in other directions. In a New York daily paper which claims to be conducted with special regard for respectability and avoidance of unseemly sensationalism, there appeared, therefore, an editorial opposing all inquiry on the part of the legislature into the methods of animal experimentation. It is worth while to see how matters of history were placed before its readers by one of the most reputable of New York journals:

"... An outcry was raised against the English doctors in the early seventies, and it was decided to investigate their laboratories. A Royal Commission was appointed in 1875 by Queen Victoria. The Commission took elaborate testimony, and found no material abuse; but owing to the inflamed state of the public mind, and the attitude of many members of the medical profession, who at that early date did not appreciate the importance of the experimental method, a restrictive law was recommended, which resulted in the calamitous measure of 1876.

"Far from allaying the British agitation, as was expected, the investigation only served to stimulate it. . . . A demand was made in 1906 for a second full investigation of laboratory methods. Again a Royal Commission was created, which took testimony for a year and half. Its report, submitted in March last year, overwhelmingly disproved the charges that the medical experiments upon animals are immoral and unjustifiable. . . . *The doctors of England have for a generation had to flee to the Continent* to prosecute their necessary labours. Is the experience of Great Britain to be repeated in the United States at the hands of persons who have become deluded into insensibility to human suffering?"[1]

Now, this editorial utterance is not exceptionally misleading. In scores of newspapers throughout the United States just as ignorant and as prejudiced statements find editorial expression every year. It aims to justify the closing of the laboratory to all investigation whatever, and it attempts to do this by misstatements regarding historical facts. It tells us of an "outcry raised against the English doctors in the early seventies," forgetting to mention the attacks made by the *British Medical Journal*, the *Lancet*, and other medical periodicals, against the terrible cruelties of the practice long before the "early seventies." The Royal Commission of 1875, we are told, "found no material abuse." What

[1] Editorial in *New York Times*, January 28, 1913.

is meant by the qualifying adjective "material"? Let us see how the inquiry impressed an impartial observer, the Lord Chief Justice of England.

"Is, then, the present law reasonable? It is the result of a most careful inquiry, conducted by eminent men in 1875, men certainly neither weak sentimentalists nor ignorant and prejudiced humanitarians, men among whom are to be found Mr. Huxley and Mr. Erichsen, Mr. Hutton, and Sir John Karslake. These men unanimously recommended legislation, and legislation, in some important respects, more stringent than Parliament thought fit to pass. They recommend it on a body of evidence at once interesting and terrible. Interesting, indeed, it is from the frank apathy to the suffering of animals, however awful, avowed by some of the witnesses; for the noble humanity of some few; for the curious ingenuity with which others avoided the direct and verbal approval of horrible cruelties which yet they refused to condemn. . . . Terrible the evidence is for the details of torture, of mutilation, of life slowly destroyed in torment, or skilfully prolonged for the infliction of the same or diversified agonies, for days, for months, in some cases for more than a year."[1]

This was the view of the Lord Chief Justice of England of that day; and yet the unknown scribe, writing in a New York newspaper, without adducing a particle of evidence, would have his readers to believe that the Commission of 1875 "*found no material abuse.*"

Equally unfair and inaccurate is the editorial reference to the report of the Royal Commission of 1906. The conclusions set forth in this report cannot possibly be stated in a single sentence without leaving essential matters unstated. The six principal recommendations of the Royal Commission were all in the direction of reform, *and of reform that implied the existence of*

[1] *Fortnightly Review*, February, 1882.

abuses that required change. The subject has been treated in a previous chapter, and need not occupy attention again.

But the worst misstatement in this editorial intended to incite prejudice against any inquiry in the State of New York was that which referred to the effect of the English law governing the regulation of vivisection. It is now nearly forty years since this law came into force. The editor speaks of it as " the calamitous measure of 1876 "; and after declaring that " the doctors of England have for a generation had to flee to the Continent to prosecute their necessary labours," asks his readers whether " the experience of Great Britain is to be repeated in the United States ?" If this assertion were true, then assuredly the law would have been regarded with detestation and abhorrence by the medical profession of England, and by the teachers of medical science throughout the land.

Now, it so happens that the impression given is wholly false. It did not originate with the editorial writer; for many years the assumed evil results of the English law have been held up for our warning by those who desire a free hand in vivisection in America. But is it true that the law of 1876 is regarded in England as a calamitous measure, which Parliament should hasten to repeal ? On the contrary, so far from being thus regarded, a large majority of the representatives of medical science in England are in favour of the law. Of course, every authority can suggest modifications for its betterment, but the principle which underlies the measure, of inspection of laboratories and the restriction of vivisection, they do not condemn. That it is a

perfect measure, the leaders of the medical profession do not assert, but they evidently consider it as better than no law at all. It certainly is not considered, as the American editor calls it, "the calamitous measure of 1876."

The proofs of this attitude of the English medical profession may be found in the evidence given before the Royal Commission on Vivisection, the final report of which appeared in 1912. The misapprehension concerning the working of the English law is so widespread in America and is so sedulously cultivated by those who oppose any reform, that it seems worth while to show just how the law is regarded in the land to which it applies.

Sir Douglas Powell, President of the Royal College of Physicians, the physician to the King, and Senior Physician to Guy's Hospital, was asked whether the laws at present governing vivisection "have been in any way noxious to Science?" "No, I do not think so," was his reply. "I think, as administered at the present time, they have not interfered with the advance of Science." Sir Henry Morris, President of the Royal College of Surgeons, being asked substantially the same question, replied: "I think the present Act of 1876, under which vivisectional experiments are done, *was amply protective against cruelty, and sufficiently free and liberal for the due prosecution of proper scientific and physiological inquiry.*" Considering their source, are not these remarkable testimonies concerning what it is the fashion in America to designate as "the calamitous measure of 1876"?

What is the opinion of the law held by men engaged

in teaching in the medical schools of England? Do they demand its repeal?

Dr. Pembrey, the Lecturer on Physiology at Guy's Hospital, London, does not like many of the restrictions; yet, being asked if he advocated the abolition of the Vivisection Act, replied: "No, I would not do that. . . . I think only people interested and people who are competent should be allowed to make vivisection experiments." The professor of physiology in the University of Cambridge, Dr. J. N. Langley, told the Commissioners: "*I would much rather have the Act than no Act.* I think it would not be fair to the animals to allow anyone to experiment upon them without control." Dr. Francis Gotch, professor of physiology in the University of Oxford, being asked whether the law had restricted scientific research in experiments upon warm-blooded animals, answered: "No, I do not think it restricts it. *I think it has operated well.*" Dr. Lorrain Smith, professor of pathology in the University of Manchester, when asked if he had any objection to the present restrictions placed by law upon operations on living animals, answered, "No." Dr. E. H. Starling, a Fellow of the Royal Society, and professor of physiology at University College, London, declared that at the present time, the physiological school in England occupied a very high place in the world, "not inferior to that of any other nation"—surely a strange fact for a country suffering from what the American editor calls "the calamitous measure of 1876"!

Everywhere we find substantially the same testimony. Sir James Russell, being asked whether the law had operated in way of preventing legitimate

research, replied in the negative, giving it as his opinion that "the Act has worked with substantial smoothness." Sir Victor Horsley, widely known as an experimenter and as a surgeon, criticized many of the details of the law, yet when asked whether or not he was opposed to the Act altogether, answered: "Oh, no. I look upon the Act as necessary in view of public opinion. . . . To the purpose of the Act, that experiments should only be done in registered places and only by persons who hold a licence from the Home Secretary, there can be no objection whatever; at least, I cannot see any." Sir John Rose Bradford, professor of medicine at University College Hospital in London, being asked if it might not be better if the Act were abolished altogether, replied: "No; I think experiments on animals should be regulated by an Act." Whether there were any alterations that might be valuable, was a subject to which he had given no thought during recent years. Dr. Dixon, a professor in King's College, declared that in his opinion "*the medical profession would be strongly against the Act being repealed now.*" Dr. Thane, one of the Government inspectors, admits that science has not suffered materially by any restrictions, and has no recommendations to make. And Dr. Martin, a director of the Lister Institute, being asked if English scientific men "are less advanced than their brethren on the Continent in consequence" of the regulation of vivisection, answered very promptly, "No."

It is impossible here to quote the evidence in full; to do that would require a volume. No one of these experts claimed that the law was perfect; each representative of English science was doubtless able to

indicate some detail capable of improvement and pertaining to the better working of the law. But when it came to repealing the law altogether, not one of the distinguished men here quoted was in favour of it. The principle of State regulation, against the adoption of which in America every art of prevarication has been employed, that principle is fully accepted by the English medical profession to-day. Was it fair for the editor of a leading journal to misstate so obvious a fact? Can one imagine that the leading representatives of medical science in England, the leading teachers and professors in medical colleges and schools, would have given the evidence just quoted if for thirty years the "doctors of England" had been flying to the Continent to escape the stringency of the law of 1876? Should we not have found some witness before the Royal Commission of 1906 making allusion to this flight of the doctors of England? It is quite possible that when the law went into operation, over thirty-five years ago, its working was less satisfactory than it is to-day. Was it fair to make these early criticisms annul the evidence given by a large body of representative men before this Commission of the twentieth century in favour of the regulation of vivisection by law? Of course such an editorial tended to strengthen prejudice against legal regulation in America. It did its work. But can success so achieved ever be worthy of admiration?[1]

[1] The reader may ask why correction of so inaccurate a statement concerning the English law was not sent to the journal in question. This was done. A synopsis of all the medical opinions here given and taken from the evidence given before the Royal Commission was sent to the editor of the periodical. So far as seen, it did not appear.

An editorial in a morning paper would hardly seem worth noticing. Upon the opinions of its readers it makes its impress, and is quickly forgotten. But the same untrue assertions will be made again more than once in order to create prejudice against any legal regulation of vivisection in America. It has seemed worth while, therefore, to set forth the evidence of the absolute untruth of such statements, regarding the English law.[1]

The extent to which an untruth concerning vivisection may be worked to create prejudice against reform is afforded by a curious legend concerning the late Lord Lister, one of the most eminent men of the last century.

So far as I have been able to discover, the first appearance of the story was in an address delivered before the Women's Medical College, and reprinted in the *Popular Science Monthly* of May, 1885, nearly thirty years ago. It thus appears:

"Lister himself, no tyro, but the great master, is still searching for further improvements. But when, lately, he desired to make some experiments on animals, still further to perfect our practice, so many obstructions were thrown in his way in England that *he was driven to Toulouse* to pursue his humane researches."

"He was driven to Toulouse." The phrase is worth remembering. Fifteen years later the author of this statement appeared before the Senate Committee at Washington, D.C., to oppose a Bill regulating the

[1] In demonstrating that the English law for the regulation of vivisection is not there regarded with the disapprobation alleged by certain writers in this country, I must not be taken as claiming that the law from a humane standpoint is satisfactory. Until amended as advised by Dr. Wilson, a member of the Royal Commission, it cannot adequately protect animals liable to experimentation from the possibility of abuse.

practice of animal experimentation in the District of Columbia. In course of his address, delivered February 21, 1900, he again repeated the story:

"When Lord Lister, whose name is the most illustrious in the history of surgery, wanted to carry out some further experiments in Great Britain, where, as Dr. Leffingwell has expressed it, the 'very moderate restriction of the law applies'—experiments for the direct benefit of humanity—*he was obliged to go to France to carry on his experiments* for the benefit of the human race *because he could not do it in England!*"

Can one imagine any argument against the legal regulation of vivisection more weighty than this assertion, that the most illustrious man in English medicine was "obliged to go to France" because he could not make his researches on English soil? Could doubt of the story exist when it was related by the President of the American Medical Association before a committee of the United States Senate? This story alone may have induced the rejection of the proposed legislation.

The legend again found expression nearly three years later, in a letter written by the same person to Senator Gallinger, and telegraphed to the newspaper press throughout the country. In the *Philadelphia Medical Journal* of December 13, 1902, it appeared as follows:

"If the laws which you and your friends advocate were in force, the conditions for scientific investigation in this country would be quite as deplorable as those in England. For example, when Lord Lister, who has revolutionized modern surgery, largely as a result of such experiments, wished to discover possibly some still better way of operating by further experiments, *he was obliged to go to Toulouse to carry them out,* as the vexatious restrictions of the law in England practically made it impossible for him to continue there these eminently humane experiments."

Nearly a quarter of a century after the first appearance of this story, we meet it again. In an article entitled "Recent Surgical Progress," appearing in *Harper's Monthly* for April, 1909, we are told the same tale:

"To complete his beneficent work, *Lord Lister was compelled to go to France, by reason of the stringency of the English anti-vivisection laws.*"

The law of 1876 has now multiplied into "laws" which obstruct and hinder even the researches of a Lister. And yet two years before, in his testimony before the Royal Commission, the President of the Royal College of Surgeons in England—Sir Henry Morris—had stated: "I think the present Act of 1875, under which vivisectional experiments are done, was amply protective against cruelty to animals *and sufficiently free and liberal for the due prosecution of proper scientific and physiological inquiry.*"[1] But of the readers of *Harper's Monthly* probably not one in ten thousand had ever seen this evidence in the Vivisection Report.

It will be seen that no two of these accounts are precisely the same. They agree, however, in stating that one of the most distinguished of English scientists was compelled to leave England in order to do his work; he "was driven to Toulouse."

It seemed to me worth while to investigate the truth of this story; and accordingly I wrote to Lord Lister, asking him, among other things, if it was true that he had been obliged to go to France to carry out experiments looking to the improvement of surgical methods, because the restrictions of the English law had made it

[1] Minutes of Evidence, Question 7,805.

impossible for him to carry out his investigations in England? The reply to my inquiry was clear and definite. The italics are mine.

"12, Park Crescent,
"Portland Place,
"*December* 23, 1910.

"My dear Sir,

"It is not strictly true that I was compelled to go out of the country to perform the experiments in question.

"*I could, no doubt, have obtained a licence to do them here.* But they had to be on large animals; and the Veterinary College, in which, I dare say, I might have had opportunity given me for the investigations, is a long way from my residence, and it would have been inconvenient to have worked there. Thus, my going to Toulouse was a matter of convenience rather than of necessity.

"The circumstance was of course of no interest to anyone but myself, *and I have given no account of it for publication*. . . . I have answered your question frankly, but I must beg you to understand that it is not intended for publication.

"Believe me,
"Sincerely yours,
"Lister."

From every man's correspondence Death at last removes the seal; and Lister's true story surely may now confront the distorted fiction which in America for many years has been given so wide a publicity.

The facts are indeed different from the legend which for more than a quarter of a century has been repeated

as a convincing argument against reform. Of the malign influence of such a tale upon public opinion in preventing legislation in America, we can form no adequate estimate. For any intentional deception we may, of course, absolve the distinguished professional man who has made himself responsible as transmitter of the myth; no man with any conception of honour would state as facts what he knew to be false. But from the charge of carelessness, of gross inaccuracy, is one as readily to be freed? For a quarter of a century the statement has been in circulation—that when Lister desired to make most important researches, "so many obstructions were thrown in his way in England, that *he was driven to Toulouse* to pursue his humane researches"; and now Lister's letter shows us that he "could, no doubt, have obtained a licence to do them here"—showing that he did not even ask permission to experiment. In 1900 the public was informed that Lister "was obliged to go to France to carry on his experiments"; the readers of *Harper's* are told that "Lord Lister was *compelled to go to France* by reason of the stringency of the English antivivisection laws"; and now Lister writes that going to France was a matter of convenience, and not of necessity; that at the Veterinary College "I dare say I might have had the opportunity given me for the investigation"—showing that the opportunity had never been sought! Yet the influence of the untruth will continue for many a year.

Of Lister's extreme antipathy to the antivivisectionists and to the restriction of animal experimentation there can be no doubt. That he misapprehended the

effect of the law of 1876 we know; he imagined that even the observation of the circulation of the blood in a frog's foot under the microscope by an unauthorized investigator would render the student liable to a criminal prosecution. We can be very sure that if this were true, the Act of 1876 would never have escaped the condemnation of the scientific men whose opinions have been quoted from evidence given before the Royal Commission, men who found in this Act no impediment to any reasonable investigation. But when the reports of personal experience were brought to Lister's notice, he was willing to correct their gross exaggerations; yet—to avoid controversy, perhaps—he desired that the facts should not be published, and during his lifetime, compliance was given to his wish.

This phase of untruthfulness in the defence of unrestricted experimentation deserves far more attention than can here be accorded. One is loth to regard as possible any intent to deceive; the inaccuracy and exaggeration are undoubtedly due chiefly to ignorance on the part of men who ought to be well-informed, because the world looks to them for statements of fact concerning the benefits claimed to be due to experimentation. Take, for instance, an assertion made in testimony given before the Royal Commission by Sir Victor Horsley, a Fellow of the Royal Society, and the representative of the British Medical Association. Referring to pyæmia, or blood-poisoning, he was not content to affirm the disappearance of these formidable maladies from the hospital to which he was attached, but went on to declare their disappearance altogether. "Anybody," said Sir Victor Horsley, "who would now be asked to

write an article on pyæmia or blood-poisoning in a dictionary of surgery, *could not do it; the diseases are gone!*"[1]

This statement is a most remarkable one. The witness was once widely known as a ruthless experimenter upon living animals, and he was now defending the practice by an enumeration of its gains. Apparently, no member of the Commission questioned his evidence; the representative of the British Medical Association solemnly affirmed that as a result of vivisection certain diseases had so completely disappeared that present observation or description was impossible, and the Royal Commission accepted his word. The statement that these septic diseases had disappeared crossed the Atlantic, and nearly six years afterward, in the columns of a New York journal, it again appeared.[2] Yet the statement was untrue. It is indeed difficult to believe that any educated medical man in England or America could have read it without recognition of its untruth. Let us glance at the evidence.

If it were true that the septic diseases which relate to blood-poisoning had really been so completely abolished that description of them were now impossible—as Sir Victor Horsley declared—it is evident that as causes of any part of English mortality they would cease to appear. The report of the Registrar-General of England and Wales tells a very different story. Sir Victor Horsley gave this testimony in November, 1907. During the five years preceding, and ending December 31, 1907, *no less than* 2,933

[1] Evidence before Royal Commission, Question 15,669.

[2] *New York Times*, July 28, 1912.

persons died from blood-poisoning (pyæmia and septicæmia) in England and Wales. During the year 1907, the year that testimony was given, the tribute of 604 lives was exacted by these diseases which had "*gone*"! Even during the year following (1908), the recorded deaths due to blood-poisoning in England and Wales were 560; and yet the disease had been solemnly declared to be non-existent by the leading defender of English vivisection!

Nor is this all. In proportion to the total population the death-rate from blood-poisoning *was higher during the year that Sir Victor Horsley gave this astounding testimony than it was even forty years before.* In 1868, in England and Wales, to a million persons living, the death-rate from septic diseases, or blood-poisoning, was fifteen; the year following it was sixteen. In 1870 it rose to eighteen, falling, however, to sixteen for the next two years. Nearly forty years go by, and we find a leading English vivisector assuring a Royal Commission that blood-poisoning had so completely disappeared that a medical writer could not describe it; and the Registrar-General charging this extinct disease with a death-rate of nineteen in 1906 and eighteen in 1907, *a higher rate of mortality than a generation before!*[1]

These are officially stated facts. At the cost of half a crown Sir Victor Horsley might have learned that the diseases he so glibly declared had "gone" were still responsible for a part of English mortality, and a greater proportion even than during thirty-five to forty years before. It is this gross ignorance on the part of those

[1] For these statistics see reports of the Registrar-General of England and Wales, 54th Report, Table 16, and 73rd Report, Table 22.

who would teach us, this willingness in the defence of all phases of vivisection, to make assertions which are without foundation in fact, that justly tends to create distrust of every such statement, unsupported by proof. We are not questioning the value of asepsis, which is only a learned phrase to express absolute surgical cleanliness. The time may come when these septic forms of disease will entirely disappear. That day, however, has not yet arrived. Why declare that it is already here? Why proclaim that diseases had "*gone*" which still existed, or that an enemy had been utterly exterminated which still was responsible for hundreds of deaths?

Nor are English medical writers alone guilty of blunders and exaggerations concerning the effect of experiments on animals. In the number of *Harper's Monthly* for April, 1909, to which we have referred, an American writer blunders quite as badly as his English confrère. He tells us that "the friends of experimental research have almost completely abolished the dangers of maternity, reducing its death-rate *from ten or more mothers out of every hundred*, to less than one in every hundred."

A more ignorant statement was never put forth by an intelligent writer. Where are statistics to be found going to prove that among any people, in any land, at any time, 10 *per cent.* of all mothers giving birth to offspring perished from the accidents or diseases incident to child-birth? No such statistics can be produced, for the simple reason they do not exist. In the United States we have no official statistics of mortality covering the entire country or

reported from year to year. England, however, has recorded the mortality of its people for over half a century. What support does it afford to the assertion that at any time one in every ten mothers, bringing children into the world, perished either from accident or disease? During a period of sixty-two years, from 1851 down to the present time, there was not a single year in which the mortality of Englishwomen from septic diseases connected with child-birth *ever reached even one in a hundred.* But this is the figure for all England. Then take the forty-four counties into which England is divided, and from the downs of Devon to the slums of Lancashire, one cannot find a county in all England in which the mortality of mothers from diseases pertaining to child-birth has reached even a quarter of the ratio stated by this medical writer. "From all causes together *not four deaths in a thousand births* and miscarriages happened in England and Wales during the first year, seventy-five years ago, that official statistics were gathered; it was a death-rate of five in one thousand the following year."[1] We are not questioning the value of surgical cleanliness; we dispute only the justice of exaggerated and misleading statements concerning any fact capable of scientific demonstration. There can be no doubt that less than half a century ago, in the maternity wards of certain hospitals and in the experience of certain men, there was a death-rate from such ailments far above the average experience of the country; but it was solely due to the ignorance, the criminal blindness and obstinacy of certain men in the medical profession.

[1] "Medical Essays of Dr. O. W. Holmes," Boston, 1899, p. 156.

But a little over seventy years ago, when Dr. Oliver Wendell Holmes pointed out that this saddest phase of mortality was due to want of care on the part of medical men, it was two professors in two of the largest medical schools of America who opposed him; it was Professor Charles Meigs, of Jefferson Medical College in Philadelphia, who laughed to scorn his warnings, and held up to the ridicule of the medical profession the theories that are now accepted as facts. With such men as teachers of medical science, what wonder that for women about to become mothers certain hospitals of that day were little better than slaughter-houses, to enter which was to leave hope behind ?[1] But the experience of such hospitals is not the basis upon which Science rests conclusions when they may be ascertained by reference to the statistics of a nation. The murder-rate of Philadelphia is not to be determined by that of one of its slum districts. If, a century ago, a slave-owner of Jamaica owning ten negroes, whipped one of them so severely that he died, should we be justified in declaring that in the West Indies the murder-rate of slaves was 10 per cent., or " ten in a hundred " ? Its absurdity is manifest. When, therefore, a reputable writer for a magazine largely read by wives and mothers puts forth the statement that by reason of some experiments the death-rate of diseases incident to maternity has been reduced " from ten or more mothers out of every hundred," leaving it to be inferred that such rate

[1] " Polk told us that when he graduated in medicine, delivery in a lying-in hospital was far more dangerous than an engagement in the bloodiest battle, for during his internship at Bellevue, he saw *forty-five women die out of the sixty who had been delivered during a single month.*" —*Williams; Jour. Am. Med. Association, June* 6, 1914.

of mortality was once general, what are we to infer concerning his ideals of scientific accuracy ?

Equally mistaken is the implication conveyed by the passage quoted that some vast reduction of mortality has been accomplished in regard to this special form of disease. This belief is doubtless entertained by a majority of medical practitioners, accustomed to accept statements of leaders without investigation or questioning. But it is not true. We need to remember, as Dr. Oliver Wendell Holmes tells us, " how kindly Nature deals with the parturient female, when she is not immersed in the virulent atmosphere of an impure lying-in hospital." To demonstrate the exact facts, I have tabulated all the deaths in England and Wales from diseases incident to child-birth, as compared with the number of children born, for sixty years from 1851 down to 1910. It will probably surprise many a medical practitioner to know that so far from having vastly diminished, the death-rate from diseases of this character in England and Wales *was actually less half a century ago than it was during the ten years ending* 1910. But the facts are beyond question; they not only rest upon the official reports of the Registrar-General, but they show a uniformity year after year which it is impossible to regard as due to chance. In England and Wales, during twenty years (1851-1870) the total number of births reported by the Registrar-General was 13,971,746. The total deaths from puerperal fever during the same period were 21,935—a mortality-rate per 100,000 births of *157*. This was the period between forty and sixty years ago. During the ten years between 1901 and 1910, the births in Eng-

land and Wales numbered 9,208,209; and the deaths from puerperal sepsis were 16,341, a mortality-rate per 100,000 births of *175—greater than that of half a century ago!* The mortality-rate may now be going downward; it was in 1910 but 142 per 100,000 births, but in 1860 the corresponding death-rate was 140, and in 1861 it was 130—considerably less than at the present day.[1]

Nor is it true that recognition of the origin of this terrible disease was due to experiments upon animals. It was Dr. Oliver Wendell Holmes, in America, who indicated, in 1843, the distasteful truth that the medical attendant was chiefly responsible for the deaths from this disease; and the great lights of the profession in Philadelphia made him and his theory the butt of their ridicule and scorn. It was Semmelweis, a young assistant in the Lying-in Hospital of Vienna, who in 1847 pointed out the same truth, drawn, not from any experiments, but from rational observation in the hospital wards; and his discovery was received with contempt, he was hated and despised in his lifetime, and he died, as an American author has phrased it, " with no other reward than the scorn of his contemporaries." It was not by laboratory experiments upon living animals that the methods by which this terrible disease is transmitted became known to Science; it was common sense in the sick-chamber that discerned the clue.

The decreased and decreasing mortality of tuberculosis is not infrequently claimed as a triumph of vivisection; in the article in *Harper's Magazine* to

[1] These figures have been compiled from the annual reports of the Registrar-General of Births, Deaths, and Marriages in England and Wales. Each Annual Report furnishes the number of births and the number of deaths from puerperal sepsis.

which reference has been made, it is intimated that experimentation has reduced the mortality of tuberculosis "from 30 to 50 per cent.," by treatment springing from the discovery of Koch.

Do facts support this assertion? On the contrary, the decline in the mortality due to this dread destroyer of the human race *began more than a quarter of a century before Koch announced that discovery of a germ* which was the cause of the disease. In his report for 1907, the Registrar-General of England and Wales tells us that "throughout the last forty years there has been a steady decline in the fatality of tuberculous diseases"; and he illustrates the figures by a diagram, showing, for both men and women, the steady fall in the death-rate from this disease from a period long before its bacillus was recognized. Here are the exact figures for England and Wales:

ENGLAND AND WALES: AVERAGE ANNUAL DEATH-RATE FROM PHTHISIS PER MILLION PERSONS LIVING, IN GROUPS OF YEARS.

For five years,	1850-1854	2,811
,, ,,	1855-1859[1]	2,647
,, ,,	1861-1865	2,528
,, ,,	1866-1870	2,449
,, ,,	1871-1875	2,219
,, ,,	1876-1880	2,042
,, ,,	1881-1885	1,830
,, ,,	1886-1890	1,635
,, ,,	1891-1895	1,462
,, ,,	1896-1900	1,322
,, ,,	1901-1905	1,218
,, ,,	1906-1910	1,106

[1] For statistics relating to period, 1850-1859, see Registrar-General's 34th Report, p. 249. For years, 1861-1880, see 48th Report, Table 27. For later period, see 73rd Report, p. 21.

This table is very significant. The death-rate of consumption in England for the year 1853 was *2,984* per 1,000,000 population. From that year, down to the five-year period, 1881-1885, there was a steady decline in the mortality of this disease, amounting to a fraction less than 39 per cent. On March 24, 1882, Koch announced his discovery. The fall of the death-rate from 1881-1885 to 1906-1910, was almost precisely the same—a fraction over 39 per cent. *Now what were the causes which induced the constantly decreasing mortality from consumption during that earlier period, when the name of Koch was unknown?* Is it conceivable that they suddenly became inoperative thirty years ago? Is it not more than probable that the chief reason why the "great white plague" has steadily and almost uniformly decreased during sixty years, not only in England, but probably in all civilized lands has been the increased recognition of the value of sanitary laws and of personal hygiene? No one questions the importance of the discovery of Koch; it has given Science the knowledge that a definite enemy exists, whose insidious invasion she strives to prevent, and whose ultimate conquest may one day be accomplished—more by prevention than by cure. But when a medical writer ascribes the decrease in the mortality of this disease to the discovery of Koch in 1882, and makes no reference to the steady fall in the death-rate which went on for a quarter of a century before that discovery was known, what is to be said of his fidelity to scientific truth? Is this the ideal of fairness which the laboratory of to-day inculcates and defends?

Why does it seem worth while to dwell upon these

exaggerations and untruths? Was it necessary to go through the mortality records of a nation for more than half a century merely to prove the falsity of a single laboratory claim? I think so. These are not ordinary blunders or trivial mistakes. They are affirmations made in opposition to the slightest step toward reform of great abuses, by honoured and distinguished writers; by men who are regarded as absolutely reliable in all statements of fact. Their assertions of the vast benefits conferred upon the human race by experiments upon living animals are made in the journals of the day, in popular magazines—in periodicals which refuse opportunity of rejoinder, and which therefore lend their influence to securing the permanency of untruth. There are problems of science concerning which such affirmations would be of comparatively little consequence; if they concerned, for example, the weight of an atom or the distance of a star, the controversy would excite but a languid interest, and the correction of inaccuracy might safely be left to time. But here, on the contrary, we touch some of the most vital problems of life and death, problems that concern every one; and in defence of practices, the cruelty of which has been challenged as abhorrent to the conscience of mankind, we have distorted and exaggerated claims of utility; we have assertions that have no basis in fact; we have covert appeals to woman's fears in her greatest emergency, and to that sentiment, the noblest almost that man himself can entertain—his solicitude for the mother of his children in her hour of peril. To the malign influence of untrue suggestion no bounds can be placed; in the creation of a public sentiment, its influence ex-

tends in ever-widening circles. It is against this unfairness and exaggeration that those who take moderate ground in this question of animal experimentation have the duty of protest and complaint. We do not ascribe the unfairness to intentional mendacity. Such motive may be discarded without hesitancy, so far as concerns any reputable writer. But surely there has been a carelessness regarding the truth which even the plea of ignorance ought not wholly to condone.

And the lesson? It is the reasonableness of doubt. Every statement put forth by the Laboratory interests in defence of the present system of unrestricted and secret vivisection should be regarded with scepticism unless accompanied by absolute proofs. In an experience of more than a third of a century, I have never read a defence of vivisection without limitations, which did not contain some exaggerated claim, some misstatement of fact. To doubt is not to dishonour; it is the highest tribute we may pay to Science; for "without doubt, there is no inquiry, and without inquiry, no knowledge."

CHAPTER XVI

RESEARCH WITHOUT VIVISECTION

No phase of modern science so closely touches the welfare of humanity as the studies which concern the prevention of disease. Up to a very recent period, well within the lifetime of many now living, practically the entire energy of the medical profession was given up to the treatment of human ailments, with an almost complete disregard of problems of prevention or studies of origin. To-day, in great measure, all this has been changed, and the importance of preventing disease has come well to the front. It is permissible to doubt whether the " cure " of any of the principal infectious diseases is likely to be so thoroughly accomplished as to eliminate it as a cause of mortality, and we may regard with greater promise attempts to discover the mysterious causes of our diseases, and the best methods by which their spread may be prevented. It is certainly a great gain that during the last hundred years mankind has learned that deliverance must come through human activity, and has ceased to regard typhoid or consumption as a dispensation of Providence.

For the conquest of some of the principal maladies affecting the human race at the present time I have long questioned whether the laboratory for experimentation

upon animals offers the opportunity for the surest results. The average man has his attention fixed upon mysterious researches which are being carried on in this or that "Institute"; rumours of impending discoveries and almost certain cures are published far and wide; and gradually one gets the impression that notwithstanding abundant disappointments, it is only by yet more vivisection that the mystery will be solved. Is this a valid conclusion? In many cases, might not scientific research have a better chance to discover the secret of origin were it directed into other channels? I propose to suggest one method of scientific research with which vivisection is in no way concerned—an investigation into the cause of one of the most terrible and most threatening of human maladies—cancer, or malignant disease.

The subject is a vast one. Within the limits of a few pages it cannot be treated with any approach to the completeness which its importance demands. The utmost that can now be attempted is the suggestion of certain lines of research independent of animal experimentation, which, if carried out with completeness, might lead to results of incalculable benefit to humankind.

Outside the medical profession there are few who have the faintest realization of the facts pertaining to malignant disease. One reason for such ignorance is the lack of any organized system, in the United States, for recording the annual mortality. Except among barbarous or semi-civilized people, no such condition exists. When, during the autumn of 1912, Dr. Bashford, the Director of the Imperial Cancer Research

Fund of England, was invited to lecture in New York, he confessed that he had tried in vain to obtain American statistics concerning cancer which might be compared with those of other nations; they simply did not exist. There are a few states and a few cities for which mortality records exist, but in some of the principal states of America there is no official record showing even the total number of deaths from murder, from accident, or disease. Once in ten years the Federal Government presents us the mortality report of the census year, but even here the information is not available until a considerable period after it is collated. There is, however, one nation whose official registers for many years have recorded the mortality from each cause of disease, for either sex, and for each ten-year period of life. These records have no equal elsewhere, and are only approached by the mortality records of the Empire of Japan. The figures concerning cancer upon which we may chiefly depend are those which pertain to the English people. There can be no doubt but that the mortality from cancer in America exhibits the same phenomena, though the rate may be higher.

The first thing to impress the student is the immensity of the tribute of mortality exacted by this disease, from those in the maturity of life, and in large measure at the period of greatest usefulness. During thirty years, from 1881 to 1910 inclusive, there perished in England and Wales from cancer no less than *703,239* lives. Figures like these, for the average intelligence, are practically incomprehensible; for this thirty-year tribute to malignant disease in a single country repre-

sents more human beings than all estimated to have perished on the battlefields of Europe for two hundred years. And if we were able to add the mortality from this one disease on the Continent of Europe, it might represent a total of several millions.

Another significant circumstance is the uniformity of the tribute exacted by cancer, year after year. We can see that best by taking the actual number of deaths from this cause, in a single country, and observing with what slow, implacable, and ever-increasing steps the great destroyer advances.

DEATHS FROM CANCER IN ENGLAND AND WALES.

Year.	Males.	Females.
1905	12,470	17,751
1906	13,257	18,411
1907	13,199	18,546
1908	13,901	18,816
1909	14,263	19,790
1910	14,843	19,764
1911	15,589	20,313
1912	16,188	21,135

The terrible thing about these figures is their uniformity from year to year. With as great a degree of certainty as the farmer foretells the produce of his fields and the results of his seed-sowing, so the statistician can calculate the tribute that cancer will exact from the human race in future years. How many persons in England and Wales will die from some form of cancer during the year 1917 ? Unless some great catastrophe shall vastly lessen the total population, the number of victims destined to perish from malignant disease during

that one year will hardly be less than 38,500, and in all probability will be more. And we have no reason to doubt that in the United States the mortality from cancer would be found equally uniform were it possible to know the facts.

Nor does uniformity pertain to numbers of either sex only. Each period of life has to furnish its special toll. If we look at the mortality among men or women for a period of years, we shall see this phenomenon very clearly. In the following table we see the deaths of men from cancer, in England, at each ten-year age-period:

DEATHS FROM CANCER AT DIFFERENT AGE-PERIODS (ENGLAND): AGE-PERIODS OF MALES.

Year.	Under 25.	25-35.	35-45.	45-55.	55-65.	65-75.	Above 75.	Total.
1906	250	322	927	2,454	4,087	3,651	1,566	13,257
1907	305	277	921	2,392	4,041	3,675	1,588	13,199
1908	274	317	925	2,594	4,147	3,957	1,687	13,901
1909	262	296	921	2,581	4,319	4,174	1,710	14,263
1910	283	337	1,001	2,778	4,377	4,315	1,752	14,843
1911	309	317	978	2,901	4,627	4,602	1,855	15,589

Precisely the same phenomenon is to be found in the cancer-mortality of women. Each ten-year period of life exacts its own proportion, with an increasing death-rate out of proportion to the increase of population.

Another fact, attainable only by the study of English statistics, is the singular regularity with which malignant disease selects different parts of the body year after year. If proclivity to this mysterious ailment were a matter of chance, or dependent upon the irregular action of certain forces, we should certainly fail to find

such uniformity, or such approach to uniformity, as exists. One year, for instance, there would be, let us say, a preponderance of attacks upon the skin; another year the digestive organs would be the principal sufferers; a third year the joints and muscles would be chiefly involved. The actual experience proves that we are subject here to forces of incalculable stress, which nevertheless press steadily and uniformly upon humanity, where the habits and environment are the same. In the year 1901, for example, of the total number of fatal cases among men, the seat of the disease was the stomach in a little over 21 per cent. of the total number of cases. In 1910 the proportion was also 21 per cent. During the ten years 1901-1910, of the total mortality, the stomach was the organ involved in but a fraction over *21 per cent. of the total cases.*

Is cancer increasing ? This is a question of vast importance to the human race. That in proportion to total population more die from the disease to-day than twenty or thirty years ago, is a fact about which there can be no doubt. Dr. Stevenson, in the Report of the Registrar-General for the year 1910, tells us that in "all countries from which returns have been received the mortality has shown a general tendency to increase in recent years." Speaking on the "Menace of Cancer," the statistician of the Prudential Insurance Company of America affirmed that "the cancer death-rate in the United States is increasing at the rate of 2·5 per cent. per annum, and a corresponding increase is taking place practically throughout the civilized world." The cancer-rate among men in the United States has increased, according to the same

authority, 29 per cent. during the last decade. The steady increase of cancer year after year is strikingly shown by a curve diagram, based upon the English mortality for several years.

A significant illustration of the steady increase in the mortality from cancer is shown by its fatality among women in England between the ages of forty-five and sixty-five. In the year 1875, of all deaths of women at this period of life, one in ten (in round numbers) was due to some form of malignant disease. In 1890 the tribute exacted by the disease had become one in eight. Ten years later—in 1900—of all women dying in England during this period of middle life, the toll of cancer was one in seven; and in 1910 the corresponding proportion was one in five! At this rate of increase it will not be many years before a full third of all the deaths of women at this time of life will be due to malignant disease. There can be little doubt that the same phenomenon would be found to pertain to American experience, were it possible to disentangle the facts from the obscurity in which they are now permitted to lie. It is a curious fact that in England until the year 1900—and, so far as we know, for thousands of years—the death-rate from consumption among women was considerably higher than that of malignant disease; that in 1903, for the first time, the cancer-mortality of women exceeded that of phthisis; and that in 1910 it had so far surpassed it that they are not likely ever again to be equal, unless we shall discover the cause of the more fatal plague.

The theory has been put forth by certain writers that the increased death-rate from cancer is due, not

to any increased frequency of the disease, but rather to improved methods of detection. It is quite certain that fifty years ago, for instance, surgeons were less able and less willing to pronounce judgment regarding obscure cases of internal tumours. But if the better diagnosis of to-day accounts for some part of this increase since 1860, it does not seem probable that it can explain the rising death-rate of the last ten or fifteen years. The medical practitioner of 1900 was certainly as well qualified to pronounce upon the character of the disease as the surgeon or physician of to-day. Nevertheless, the cancer death-rate of England in 1910 had increased 16 per cent. above that of ten years before, and during the fifteen years 1895-1900 it had increased fully 28 per cent. Certainly in these last few years there has been no such increased ability to detect the disease as would account for all this. Yet another fact suggests doubt of this optimistic hypothesis. If the increased cancer death-rate were due merely to the increased ability of the physician or surgeon to recognize the ailment, we should certainly find that the increase of cancer would be seen only in those parts of the system, such as internal organs, where some degree of doubt might perhaps be entertained; while, on the other hand, there would be little or no increase discernible in the mortality of cancers affecting parts of the body where its nature could not be mistaken by any intelligent physician or surgeon. Now, for a number of years, perhaps with this hypothesis in view, the Registrar-General in England has tabulated all deaths from cancer of either sex, not only by different age-periods, but also by the part of the body affected by the fatal

disease. A study of the facts thus made known is extremely suggestive. It is true that a marked increase in the death-rate has occurred in cancer affecting internal organs, as we should naturally suppose; but it is also true that malignant disease affecting parts of the body where little or no doubt of the character of the ailment could be entertained by any physician, exhibit in some instances as marked an increase in the death-rate as in some other cases, where doubt of malignancy might be justifiable. For example, cancer of the tongue among men showed a death-rate of 32 per million population in 1897; it went up to 47 per million in 1910—an increase of nearly 50 per cent. Cancer of the female breast showed a death-rate of about 142 per million population in 1897; it had arisen to a rate of 190 per million only thirteen years later; and here, assuredly, the nature of the disease in fatal cases cannot be mistaken.[1] Cancer of the stomach in its final stages does not present insuperable difficulties in way of diagnosis, but the death-rate increased for men about 40 per cent. in fifteen years; and although some of this increase may be due to more careful discrimination between cases of malignant disease affecting the liver, yet this explanation cannot account for the increase when both organs are considered together. The subject is worthy of careful and extended investigation, but even a cursory examination of the facts now available indicate a real increase in the death-rate from cancer in England, and probably in every other civilized country of the world.

[1] "During fourteen years . . . the mortality from mammary cancer has increased by about 29 per cent., *notwithstanding lives saved by improved methods of operation*."—Registrar-General's Report for 1910, p. 69.

But all these phenomena are of secondary importance compared with the great problem of medical science—the yet undiscovered cause of malignant disease. During recent years the study of cancer has been conducted with scientific enthusiasm in many laboratories. Vast sums of money have been given, in the hope that these studies may one day lead to the discovery of a cure. One whom I knew in his youth became the heir of great wealth; lived to see one whom he loved perish from the disease; was struck down himself, and dying, left a fortune for the purpose of promoting research concerning cancer. And yet to-day the problem, as attacked in the various laboratories of Europe and America, is apparently as far from solution as it was forty years ago. Sir Henry Butlin, ex-President of the Royal College of Surgeons, England, is said to have operated on as many cases of cancer as any surgeon of his day. Yet, speaking in October, 1911, he said:

"I have been associated with the Imperial Cancer Research and in touch with its staff from the foundation of the Research, and have been a member of the publication committee of all its scientific reports. *It has done nothing on the lines in which observation has been so useful.* It has not unfolded the life-history of a single variety of cancer, so that we can base our operations on the information. It has not even discovered whether spontaneous cancer of a particular part of the body in the rat or mouse runs a similar course to spontaneous cancer of the same part of the body in the human subject. These problems are not suited for experimental investigation; they are determined by observation."[1]

No "serum," no drug, no curative agency of any kind, has thus far been discovered upon which the slightest

[1] *Lancet*, London, October 7, 1911.

dependence may be placed. The only measure of relief which medical science can now suggest is early and complete extirpation. Of what proportion of cases even this insures immunity we cannot tell.

Without decrying what has been done in the laboratory, may it not be that we have gone in that direction as far as there is any hope for success, and that all effort should now be directed *to the discovery of the cause of malignant disease in human beings?* That great secret still eludes us, but until we can penetrate that mystery, it is difficult to perceive how we may hope to prevent the increasing prevalence of the great destroyer. Yet there is one method of investigation which (speaking from a study of cancer statistics for more than twenty-five years) seems to me to offer, more than all others, a reasonable hope of ultimate success. It is independent of all sacrifice of animal life. It involves, however, an expenditure far greater than is possible for any private investigator, and probably only by the co-operation of the Government can it be undertaken with any chance of success. Yet, if Society can once be aroused to a recognition of the need for the completest possible investigation concerning malignant disease, and particularly the reasons for its differing prevalence among people of different nationalities, habits, and general environment, that inquiry will take place, even though it cost the price of a battleship.

The subject is so vast and involved that it cannot be discussed with any approach to completeness in a single essay. Suppose, however, that we glance at the theory which regards cancer as due to a microbe which in some mysterious way gains admission into the human

body, lying for a time dormant, but liable under appropriate stimulation to be awakened into malignant activity. We know at the outset that if any such germ of disease exists, it has thus far escaped visual recognition. No human eye can be said with certainty to have seen it, even when aided by the most powerful microscope; but this may be due to the fact that, like the germ of certain other diseases, it is so minute that it lies beyond the range of human vision. There are, however, certain facts pertaining to the disease which have significance. We have already seen that in a given country there is a kind of uniformity in the number of those dying from the disease from year to year; but another phenomenon relates to the unequal pressure in different countries of the causes of the disease.

1. *The death-rate from cancer appears greatly to vary according to race and environment.*

CANCER DEATH-RATE IN DIFFERENT COUNTRIES PER 100,000 POPULATION.

FIVE-YEAR PERIODS.	Switzerland.	England.	Italy.
1886-1890	114	63	43
1891-1895	122	71	44
1896-1900	127	80	51
1901-1905	128	87	55

Here is the record of a period of twenty years. These differences of proclivity to cancer are exceedingly curious. Can the reader perceive why they exist ?

The rate in England is quite 50 per cent. higher than that of Italy. If we explain this by the hypothesis of greater skill in detecting the disease, what are we to

say of the cancer-rate in Switzerland, which is 50 per cent. higher than that of England ?

But here is another curious fact. The United States census of 1900 permits a contrast of the mortality of cancer according to the birthplaces of mothers of those attacked. Here, for instance, is the death-rate from cancer and tumour of persons of different nationality, calculated in three sections of the country—the rural districts of the registration area, the cities of the same section, and the cities outside the registration area.

DEATH-RATE IN THE UNITED STATES FROM CANCER AND TUMOUR PER 100,000 WHITE POPULATION, ACCORDING TO THE BIRTHPLACE OF THE MOTHERS OF PATIENTS.

COUNTRIES.	Registration Area.		Other Cities.
	Rural Districts.	Cities.	
Italy	20	24	39
Russia and Poland ..	26	30	26
England and Wales ..	79	77	80
Ireland	90	82	86

How are these facts to be explained ? What is there about the habits, the environment, the dietetic peculiarities of the Italians in America, which tends to confer upon them a greater immunity from cancer than is possessed by those whose maternal ancestry goes to England or Ireland ? Assuredly this immunity is not due to chance. It is governed by some law, even though that law be unrecognized to-day. If the low cancer mortality of Italy made itself manifest only in that country, we might suspect it indicated a lack of skilled

diagnosis; but here we find it just as prominent in three different sections of the United States. Not only that, but the difference is seen in comparison of parts affected by cancer. For persons whose mothers were born in Ireland the death-rate in cancer of the stomach per million population was 184; the corresponding rate for Italians was 56.

Does the poverty of the people have anything to do with proclivity to cancer? In one way this is a probability. If we could compare the general prosperity of men and women whose parents were born in the United States with the entire population of which the parents were born in other countries, it seems to me that we should find the second class, taken as a whole, to be financially less prosperous than the first. Now, in 1900, the census reveals that in the United States the class to suffer chiefly from malignant disease was that which included *the foreign-born population*, alike in cities, in rural districts, within or without the registration area. This is certainly a fact of tremendous import. In America the population is a blend of every European nationality. Why, taken as a whole, should the native American suffer from one mysterious disease less than some of those who have come more recently to the United States?

In another work I have ventured to suggest that if we are to discover the cause of cancer, we must study the habits and customs of those still living who have become the victims of some form of this mysterious disease. A theory held by some is that cancer is due to the consumption of meat. If one means that the flesh of perfectly healthy animals is liable to cause cancer,

the hypothesis is one for which it seems to me that evidence is far from being sufficient to justify belief. But if, on the other hand, it is suggested that malignant disease may be due to germs derived from animals which were suffering from some form of cancer when they were killed for the food of human beings, then much that is otherwise obscure becomes plain. We should expect in such cases to find cancer more prevalent among the poor than among the rich, and especially prevalent among those who, from carelessness, or ignorance, or seeming necessity, consume the cheaper kinds of meat. And since, both in their native land and in America, the Italian population consumes less meat than people of other nationalities, we should expect them to be less liable to be infected by the germs of malignant disease.

A few years ago a medical writer who has given much attention to this disease published some of his investigations into the cancer death-rate of Chicago. Taking the figures for a single year, he discovered that the "cancer death-rate among the Irish and German residents of Chicago is the highest in the world, being nearly 300 per cent. higher than in their native countries."[1] Of each 10,000 population of each nationality living at the age of forty years and over, he found that the deaths from cancer among the Germans was 76, among the Irish 70, among the Scandinavians 52, and among the natives of Italy 24. It was found that, while the staple diet of Italians in Chicago was macaroni and spaghetti,

[1] See article by Dr. G. Cooke Adams in *Chicago Clinic* of August, 1907, pp. 248-251.

the people of other nationalities among whom the cancer-rate was exceedingly high, "consume large quantities of canned and preserved meats and sausages, *often eaten uncooked.*" He discovered that a large part of the fresh meat prepared at the establishment of a certain slaughtering establishment in Chicago was derived from animals which had been condemned on the ante-mortem inspection, but the flesh of which was permitted *to be sold as pure food after the diseased parts had been removed.* Sold thus at a cheaper price, such meat was chiefly consumed by the poorer classes of the foreign population. And while Dr. Adams does not adopt the hypothesis of a cancer-germ, he does not think there can be "the slightest question but that the great increase in cancer among the foreign-born over the prevalence of that disease in their native countries is due to the increased consumption of animal foods, *particularly those derived from diseased animals.*"

A statement like this is calculated to induce serious reflections. The average reader finds it difficult to believe that, according to the present interpretation of the law, the flesh of animals found to be suffering from cancer at the time of their slaughter would be permitted to pass into the world's food-supply. We are in the presence of a great mystery. We do not know how the great plague originates. But no reflecting man or woman can be insensible to the significance of possibilities when he learns that cancer affects animals which are killed for food; that in the majority of cases the disease affects some part of the digestive tract; that it chiefly prevails among the very poorest classes of our population, excepting only those, like Italians, who use

but little meat; and that, according to the official regulations of the United States Government in force to-day, *the flesh derived from cancerous animals need not always be destroyed as unfit for human consumption.* The cancerous tumour, the affected parts, must indeed be cut away, and carefully condemned. The disposition of the remainder of the meat is left to the decision of the inspector!

The regulation so far as it applies to meat of this kind, is as follows:

"*Any organ or part* of a carcass, which is badly bruised, or which is affected by tumours, *malignant* or benign, . . . shall be condemned; but when the lesions are so extensive as to affect the whole carcass, the whole carcass shall be condemned."[1]

The meaning of this regulation would seem to be perfectly clear. There is no demand by the Government that the entire carcass of an animal affected by malignant disease shall be utterly destroyed for food purposes, unless the disease has involved the entire body,—a condition as rarely found among domestic animals, as among human beings. Otherwise than this, what is there in the official regulations of the bureau governing meat inspection to prevent such use of the flesh of diseased animals as the inspector may authorize?

It seems to me that if science is ever to discover the cause of malignant disease, there should be a careful study of all the conditions under which the disease now manifests itself. The mortality from cancer in the state of New York, in 1912, amounted to 8,234; in England,

[1] Regulations governing Meat Inspection, U.S.A. Regulation No. 13, section 23. See also Appendix VIII., p. 362.

the number of those who perished from the disease in 1911 was nearly 36,000. By what figure must we multiply this mortality in order to ascertain the number of persons living who have been affected, or who now are suffering from cancer? Nobody knows. What has been the success of surgery in securing immunity from a recurrence of the disease? So far as the entire country is concerned, we are entirely ignorant. Is it true that among the class of people in such cities as Chicago, where cancerous animals are used for food, cancer is especially prevalent year after year? If true, it should be fully known. Such facts must be ascertained, if ever we are to penetrate the secret of the disease. Even the number of victims of each sex is not given in the mortality reports of the state of New York at the present day.

Let us suppose that the time comes, when with a realization of peril pertaining to ignorance, public sentiment shall urge the attainment of knowledge concerning cancer as it now affects the general population. In what way is information of this character to be secured? Assuredly not by any of the ordinary census methods, implying publicity. The only practicable enumeration would be one conducted privately, by members of the medical profession. Nor can it be done parsimoniously. In the state of New York, there may be, to-day, 50,000 cases of malignant disease. To have every case, completely reported, might cost the state half a million dollars. Perhaps even the patient should be compensated. Certainly some method could be adopted whereby the reports should be absolutely confidential, the patient being known only by a number. But all

this is of minor consequence. When the necessity of the inquiry is everywhere recognized, the details pertaining to accomplishment will be easily arranged.

Assuming the willingness of patients and friends to assist in making a State-wide inquiry concerning the prevalence of malignant disease, let us see in what directions the investigation will be conducted.

First. After securing the name, age, and place of birth of each individual sufferer, and the particulars which would suggest themselves to every physician or surgeon, inquiry should be made concerning the parents; the names, nationality, religious faith, place and date of birth, the state of health if living, and if dead, the date and cause of death. Especially should inquiry be made whether there have been other cases of cancer in the family, and their termination or present state.

Second. What is the location of the suspected ailment? When were the first symptoms manifested? To what cause, if any, were they ascribed? Has any surgical operation been performed, and if so, what are the details of time and place? Has recurrence followed operation? For what period was there freedom from symptoms?

What is the social position of the patient? Does he belong to that class which is enabled always to select the best food, the most sanitary dwellings, and all the conveniences of well-ordered and comfortable existence; or, on the other hand, to the extremely poor class, which disregards cleanliness, indulges to excess in the use of stimulants, and consumes the poorest and cheapest kinds of meat? I deem it of great importance that the completest possible information be secured concerning the

usual diet of every sufferer from this disease. Is he a vegetarian? Are viands invariably well-cooked, or eaten sometimes rare or raw? Is there a liking for the canned products of the packing-house, or for sausage that comes from the same source?[1] What is the water-supply? Within the knowledge of the patient or friends, has there been any other case of malignant disease in the same house? Is residence near any fresh-water lake or stream?

These are suggestions only. They constitute merely an outline of the information that is necessary, concerning the living sufferers, in whom the disease has made its appearance. Doubtless the average reader will discern no reason for all these inquiries. Yet each one has some pertinency to the possible discovery of the great secret. Does inquiry concerning family history seem useless? It should have a decided bearing on any theory of heredity. Does the occurrence of near-by cases have no significance? We are not yet in a position to state this as a fact. Does inquiry concerning religion seem especially impertinent? What if some future investigation should prove that cancer everywhere, is more prevalent among the Christians than the Jews? Does the social condition of the sufferer seem to have no relation to cause? What if we discover, that everywhere,—and not among the foreign population of Chicago only,—cancer finds an undue proportion of its victims among the poorest and most poverty-stricken element of every nationality? Does suggestion of inquiry concerning diet induce a smile? It should not,

[1] The relation between diseased meat and human ailments is treated at length in my work on "American Meat," New York, 1909.

so long as meat derived from cancerous animals is permitted by Government authority, to pass inspection, and to be distributed throughout the world. And no inquiry concerning cancer can be deemed complete which has not fully investigated the extent to which this atrocious practice has been carried on for the past quarter of a century.

But this State-wide inquiry is only a part of the work. Every year, for a period of at least ten years, the record must be revised, the result of surgical operations recorded, the deaths enumerated, the new cases added. The expense of each annual revision would be far less than that of the original inquiry; but the inquiry will be costly, and should be costly, if it is to be accurate and complete. Here, indeed, would be the opportunity for the co-operation of organizations devoted to "cancer research," and particularly of that new foundation, the income of which for a single year is far more than the original investigation would cost.

And when the inquiry is completed; when all attainable information concerning the occurrence of malignant disease shall have been secured not for a single year, but for a period of successive years, not for one community, but for an entire state, and for each of its constituent parts, what then? Then I believe a knowledge of the cause of cancer will soon be attained. When we know the cause, then there will be hope for prevention, which is far better than cure. All the various experiments upon mice, for example, whatever they may teach concerning the disease in the lower animals, have not enlightened us concerning the cause of the malady in mankind. The greatest and most

promising field for scientific research, now almost untrodden, awaits the explorers of the future. In a world where now there is comparative unconcern, there may soon be fearful apprehensions of the increasing prevalence of an almost irremediable disease. Within the coming century, the investigation I have here outlined, will sometime be made; and as a result, the cause of cancer may be as well known to medical science, as the causes of typhoid fever or malaria,—mysteries that seemed insoluble less than a century ago. And I venture with assurance to predict, that some time within the next fifty years, the Governments of England and of the United States, alarmed, it may be, by a continually increasing mortality from cancer, will condemn under severest penalties, the sale for human food of meat derived from animals affected by malignant disease,—no matter how great may be the pecuniary loss to every slaughtering establishment and packing-house in either land. The public awakening to danger that must precede legislation cannot yet be discerned; and before the national apprehension is aroused and apathy ceases, probably more than a million lives will be sacrificed to cancer, in England and America alone.

NOTE.—"The deaths ascribed to cancer or malignant disease in England and Wales during 1912, numbered 37,323. The mortality of males was 913 per million living, as compared with 891 in 1911, and that of females, 1,117, as compared with 1,098. *In the case of each sex, these rates are the highest on record.*"—From 75th Report of Registrar-General, 1914, p. lxxxiii.

CHAPTER XVII

THE FUTURE OF VIVISECTION[1]

ATTEMPTS to forecast the future development of Humanity in any direction have always possessed for some minds a peculiar fascination. Plato and Bacon had their visions of a State superior to that in which they lived; Burton foresaw improvements in the administration of justice, and the condition of the poorer classes, which waited for two centuries for some measure of realization; even Defoe had his list of "projects," some of which, laughed at in their day, are the realities of our time. No great reform in any direction was ever effected which had not been the unrealized vision of a dreamer.

And such dreams are the romance of history. For any one to have imagined two centuries ago, that the African slave-trade and negro slavery would some day be condemned by every civilized nation, not because they were pecuniarily unprofitable, but because they contravened the conscience of Society and its sense of righteousness, required a faith in the ultimate triumph of justice over greed, that not one man in ten thousand possessed. For Calvin or Torquemada to have imagined

[1] Address delivered at Washington, D.C., before the International Humane Congress, December 10, 1913.

the coming of a time when the burning of an unbeliever would not be regarded as pleasing to the Deity, demanded a sublimer vision than either of them possessed. Custom and universal acceptance would sometimes seem to create impregnable barriers against change. But with the slow lapse of years, the venerated custom is attacked by doubt; the superstition is undermined, and the great evil gradually passes from the sight. No great wrong is so securely entrenched, as to be absolutely safe from the ultimate condemnation of mankind.

What is to be the future of vivisection, as conducted in America to-day? Is it to continue, without other limitations against cruelty than those which are self-imposed, without legal restriction or restraint, so long as civilization endures, ever widening its scope, ever increasing the hecatombs of its victims, until uncounted millions shall have been sacrificed? Is protest against excess to grow weaker, until the ideal of humaneness in the laboratory shall become a scoff and a byword? Is approval of any research in the name of Science to become stronger until it shall cover the vivisection of human beings as well as the exploitation of animals? Or are we to expect, as the result of agitation, the legal suppression of all scientific research requiring animal life, within the limits of the next half-century? It is easier to ask questions than to answer them. Yet, as one who for over thirty years, has taken some part in the agitation for reform, you may be willing to permit a forecast of probabilities, vague, it may be, as the vision of a sailor peering through the darkness that environs the ship,—but the best he can do.

No estimate of the future of vivisection in America

can be of value which does not recognize the power of the laboratory at the prseent day. Half a century ago, the vivisection of animals was rarely practised; to-day, in the older states, there are few institutions of higher learning which do not possess ample facilities for animal experimentation. Millionaires, many times over, have been induced to devote some part of their great wealth to the foundation and support of institutions for experimentation upon living things. Farms have been established where animals destined to sacrifice, are born and bred. It may safely be estimated that in America, to-day, there are not less than five hundred times as many experiments every year, as took place half a century ago.

One must recognize, too, the change which has taken place in the attitude of a majority of the medical profession towards this reform. During the past thirty years, thousands of young men have entered the profession, who have been carefully educated to regard all criticism of animal experimentation as due to a sentimentalism worthy only of contempt. I greatly doubt whether even one per cent. of the physicians in America, under fifty years of age, have ever heard that half a century ago, the feeling of the medical profession, in the English-speaking world was almost unanimous in disapproval and condemnation of methods and of experiments which now pass without notice, and uncondemned. When men, educated to come into the closest of relations with their fellow-beings, are thus prejudiced and uninformed, should we wonder that their views are so widely accepted? The wonder to me is rather that so large a minority are not to be

convinced that everything in a laboratory must be right.

Another element of the forces that to-day are marshalled against reform, is the Press. Political journals, which even twenty-five years ago endeavoured to hold an attitude of impartiality, now present editorials almost every week in ridicule of any legal regulation of vivisection, or of any opposition to laboratory freedom. The intimate knowledge of medical matters sometimes exhibited by the writers, would seem to indicate a closer relation between the physiological laboratory of to-day, and the editorial sanctum, than existed forty years ago. There are journals, so closely related, apparently, to laboratory interests, that they do not permit correction of editorial misstatements or mistakes to appear in their columns, even when such blunders are pointed out. The old impartial attitude of the Press seems—except here and there—to have completely disappeared. Any forecast of the future must take into account this vast and ever-increasing influence.

Yet another impediment to the legal repression of any cruelty pertaining to animal experimentation is one which we all deplore, even though no remedy appears in sight. It is not the opposition of enemies, but division among friends that constitutes, in my opinion, the greatest present obstacle to any reform. It is as though against some strong fortress, different armies were engaged in an attack, each with its separate purpose, its own plan of campaign, its own ultimate aim, and now and then crossing and recrossing in each other's way, to the infinite delight of the enemy. Some of us make the demand that *all* such inquiry on the part

of Science shall be made a crime; and some of us take the position of the English-speaking medical profession of forty years ago, that *abuses and cruelty alone* should be the object of attack. If opposition from the first, had been solely directed against *abuses* of vivisection, could any reform have been achieved? It is not certain. When Mr. Rockefeller opened his purse on the vivisection table, he added immeasurably to the strength of the forces that resist reform. And yet it is difficult to over-estimate the loss to any cause of such men as Sir Benjamin Ward Richardson, as Professor William James and Professor Henry J. Bigelow of Harvard University, or of Dr. Theophilus Parvin of Jefferson Medical College,—to refer only to the dead. Their criticisms of cruelty were outspoken, but they could not join in universal condemnation of all such inquiry into the phenomena of life. Might it not have been better—even at the cost of a lessened demand—to have kept on the side of reform that large element in the medical profession which willingly condemned abuse, but declined to denounce the simplest demonstration, or the most painless investigation? Of course such an inquiry will receive different replies. It is ever the easier task to make condemnation absolute. The thing has been done; the past is beyond recall. But in looking at the future, we cannot but recognize the changed attitude of a majority of the medical profession from that of half a century ago.

The strongest position of the modern physiological laboratory, is its *secrecy*. It occupies in the popular mind almost precisely the place which was held for centuries by the Inquisition in Spain. There were

men who doubtless objected, then, to the secrecy of the dungeon. "Trust us absolutely," cried the inquisitor. "Ours is the responsibility of preventing errors that lead to eternal death. Can you not leave it to us to decide what shall be done in the torture-chamber, being assured that *no more pain will be inflicted than is absolutely necessary for the end in view?*" "Trust us absolutely," demands the vivisector of to-day. "Can you dare to question the purity of our motives, the unselfishness of our aims, the mild and humane methods of our experimentation? Why should any one wish to disturb the silence and secrecy in which we carry on our work? Cannot the public leave it solely to us to determine what pain may be inflicted upon animals, being certain that no more suffering will be caused than we deem to be necessary for success?"

The parallelism is complete. It is a call for implicit confidence. And that confidence has been given by a too credulous public. Three hundred years ago, when the victims were marched in long procession from dungeon to burning-place, they were accompanied by an approving mob, eager to inflict every indignity and to applaud every pang. The men about the burning-place were not intentionally cruel. They had simply given the control of their judgment to the inquisitor. Is it so very different, to-day, in the matter of vivisection? Why should we hesitate to recognize that at the present time, a large section of the general public have made the same act of surrender, justifying whatever the laboratory demands, and defending whatever it defends?

It seems to me probable, therefore, that for many

years to come, the laboratory for vivisection, *if only it can maintain its secrecy*, will continue as serenely indifferent to criticism, as completely master of the confidence of modern society, as supreme in power and position as was the Spanish Inquisition of three centuries ago. New laboratories will be founded upon ill-gotten wealth; new inquisitors, with salaries greater than those of Washington or Lincoln will take the places of those that retire; new theories, now unimagined, will demand their tribute of victims to help prove or disprove some useless hypothesis; even new methods of torment may be invented, and new excuses for their necessity put forth. Nor is this all. If the laboratory of the present day shall continue to maintain its hold upon the intelligence of modern society; if it can keep unimpaired that confidence in its benevolent purpose, that belief in accomplishment, that faith in utility which now so largely obtains; and if, moreover, it can secure for the charity hospital that absolute power and secrecy which it has gained for itself in animal experimentation, then, within the lifetime of men now living, human beings will take their place as " material " for investigation of human ailments. Upon the living bodies of American soldiers, upon lunatics in asylums and babes in institutions and patients in charity hospitals, experiments of this character have already taken place. Is utility to Science to be considered the standard by which human actions are to be judged ? Then, even within the present century, experimentation upon human beings may be openly acknowledged as a defensible method of investigation.

Now all this is not a cry of despair, a confession of

defeat. It is meant only to be rational recognition of existing conditions, and especially of the forces that now prevent reform. Perhaps if the armies were united, a different forecast could be made; but that union is beyond hope. The enthusiasm that would expect to eliminate a great evil on other terms, and within the space of time occupied by a single generation does not seem to me to be justified by the records of history. Of the ultimate triumph of the reform of vivisection, there can be no more question than of the result of the agitation against human slavery, against the torment of criminals, against the burning of the heretic or the witch. In what way may we anticipate its coming ?

We may be certain that a period will yet arrive, when among the more intelligent classes of society, doubts concerning the practical utility of all that is done in the name of Science will take the place of present-day credulity. It is too soon to expect a general spirit of inquiry to arise; the closed laboratory has not been so long in existence but that a request for more time to demonstrate possibility of accomplishment may seem not unreasonable. But some time in the future, long after we have all passed away, the intellectual world may be moved by the spirit of doubt and unrest; it will ask from the laboratory a statement of account; it will demand that the books be balanced; and that against the cost of agony and death, there be made known whatever gains in way of discoveries of clearly demonstrated value to humanity, can be proven to exist.

Like the servant in the parable, the modern laboratory has been given its ten talents. It enjoys a secrecy

which is profound, all that wealth can procure, and unrestricted opportunity for every phase of research. There is no limitation to the torments which it may inflict, without impediment or fear of public criticism, if present secrecy can be maintained. The conscience of modern society—so far as vivisection is concerned,—would seem to have "journeyed into a far country." But some day it may return to its own, and ask for an accounting of its trust.

And fifty years hence, if pressed for the proof of great achievement, of grand discoveries, what evidence will then be produced by the vivisection laboratory? How much of wealth will have been devoted to fruitless explorations in desert regions? What vast fortunes will have been paid out to professional explorers, whose work will have been in vain? What proofs will the laboratory then be able to adduce of "priceless discoveries" made within its walls, proofs resting not upon the heated enthusiasm of the experimenter, but demonstrated by statistical evidence of a decreased mortality from the scourges of disease? *That* is the test of utility, which may one day be applied not merely to Mr. Rockefeller's creation, but to every laboratory in England and America. Then, perhaps, it may not suffice to set forth discoveries, as useless to mankind, as would be the demonstration of gold and silver in the moon. Before the tribunal of an intelligent public opinion,—not of our day, but of some distant epoch, the justification of secret vivisection will assuredly be demanded. Will it be given? Against the vast cost in money, cost in depravation of the instinct of compassion, cost in the lessened sensitiveness of young men

and young women to the infliction of torment, cost in the seeming necessity of defending and justifying cruelty, cost in the temptation to exaggerate facts, cost in the countless hecatombs of victims, non-existent to-day, yet doomed to perish in pain of which no record and no use can be found,—against all this, what profit will be adduced? Something? Undoubtedly. *But sufficient to balance the cost?* When that accounting is made, will the enlightened conscience of humanity then grant condonation, because of great achievement, of all that will have been done in the name of research, and of demonstration of well-known facts? I cannot imagine it.

What can we venture to forecast regarding the future of medical school vivisections, made for the one purpose of fixing facts in memory? No one qualified by any experience in teaching can doubt the value of certain demonstrations. So far as they are performed upon animals made absolutely unconscious to any sensation of pain, it is difficult to suggest a condemnation that does not equally apply to the killing of animals for food or raiment. But the medical school laboratory seems to shrink from public scrutiny. If there were no need for secrecy, is it likely that every attempt to penetrate the seclusion of the laboratory would be so strenuously opposed? *Of what is the laboratory afraid?* If the present methods of demonstration or teaching of physiology are such as would meet general approval so far as their painlessness is concerned, why fear to make them known? On the other hand, if animals are subjected to prolonged and extreme torment for the illustration of well-known and accepted facts; if students

not only witness, but are sometimes required to perform for themselves experiments as agonizing and as useless as any that ever disgraced the torture-chambers of Magendie, we can well understand why immunity from criticism can only be secured by concealment and secrecy. Opposition to publicity or to investigation by the Government is quite conceivable, if there be something which must be hidden out of sight.

In the long-run, the policy of concealment must fail, and the whole truth be known. Then, indeed, we may hope for the beginning of reform. That fifty or a hundred years hence, all utilization of animals, whether for food or raiment or scientific ends will have absolutely ceased in England and America, I am not able to believe. But I am very sure that before this century closes, the subjection of animals to pain for the demonstration of well-known facts will have come to an end; that agonizing experiments will have ceased; that every laboratory wherein animals are ever used for experimental purposes will be open to inspection " from cellar to garret," as Professor Bigelow of Harvard Medical School said they should be; and that except as a shield for crime, the secrecy which now enshrouds the practice will for ever have disappeared.

We are living to-day in a period of unrest and change, such as the world has never known before. A new social consciousness has awakened throughout the civilized world, a feeling that for those who are to come after us, life should be happier and better than it is. Humanity is advancing toward its ideals by leaps and bounds, where once it slowly crept. Every social problem, from the prevention of cruelty, the suppression of vice, the

rescue of the submerged, to the abolition of poverty itself, is to-day more in the thought of humanity than ever before in the history of the world. We are but just beginning to learn our duties to human beings of other races; may we not be assured that the more sensitive conscience of the future will define with authority, our duties to the humbler sharers of this mysterious gift of life? Already, Science has told us, that far in the past, we had the same origin; and surely, when some higher ideal than utility to ourselves, shall dominate human conduct, there will be a new conception of JUSTICE toward every sentient being. It may mean extinction of species; but it will not mean their torment. You and I cannot hope for life long enough to see the realization of that dream. And yet, sometimes I have wondered whether it be so far distant as I have feared. But a little while ago, who of us could have imagined that in our day, the Government of the United States would listen to the cries of little birds, starving on their nests in the swamps of Florida, and prohibit the importation of the egret plumes? How much of hopefulness for the final triumph of the principles of humaneness lies in the passage of such a law!

I fancy that one day, all noxious animals, and especially those which prey upon other creatures, will largely, if not entirely, disappear. It is calculated that every grown lion in South Africa kills for food, every year, between 200 and 300 harmless animals, each one of which is as much entitled as the lion to the happiness of existence. In great museums to-day, we see the remains of creatures, like the sabre-toothed tiger, that lived probably, over a million years ago. In a century

or two, hence, the skeletons of the panther, the tiger, the leopard and the lion, will be found in the same halls of science, with those of other extinct species, that could exist only at the expense of others' lives.

Some day the question of vivisection will be merged in the larger problem, the adjustment of man's relations to animals on the basis of JUSTICE. We who are assembled here to-day, certainly are not forgetful of other cruelties than those which pertain to animal experimentation. In the awful torment endured for days by animals caught in steel traps in order that their death may contribute to the adornment of women and the luxury of men; in the killing of seals, accompanied by the starvation of their young; in the great variety of blood-sports; in the slaughter of animals, destined for human food, in all these, as well as in the cruelties that have pertained to physiological inquiries, we see exemplified man's present indifference to the highest ethical ideals. We do not oppose one phase of cruelty; *we oppose them all.* And we may be assured, that when the day dawns in which humanity shall seek to govern conduct by the ideal of universal justice, then in some more blessed age than ours, the evils of vivisection not only, but all phases of cruelty and injustice will for ever cease.

CHAPTER XVIII

THE FINAL PHASE: EXPERIMENTATION ON MAN

THERE is one phase of scientific research which cannot be passed in silence. It is experimentation upon human beings. That "no experiments on animals are absolutely satisfactory unless confirmed upon man himself," a well-known vivisector has asserted; and no one acquainted with the trend of events, could doubt the coming of a time when opportunity for such "confirmation" would be given, and when a more precious and a less costly "material" than domestic animals would be used for investigations of this kind. Writing many years ago, a distinguished jurist declared that "to whomsoever in the cause of Science, the agony of a dying rabbit is of no consequence, it is likely that the old or worthless man will soon be a thing which in the cause of learning, may well be sacrificed."

It is necessary at the outset, however, to draw a careful distinction between those phases of experimentation upon man which seem to be legitimate and right, and those other phases of inquiry which are clearly immoral. It is, of course, to be expected that certain experimenters upon human beings will endeavour to confound both phases of inquiry in the public estimation; and yet there is no difficulty in drawing clear dis-

tinctions between them. Let us see what differences may be perceived between the experimentation upon human beings which is laudable and right, and the other phase of inquiry which Society should condemn.

I. Any intelligently devised experiment upon an adult human being, conscientiously performed by a responsible physician or surgeon solely for the personal benefit of the individual upon whom it is made, and, if practicable, with his consent, would seem to be legitimate and right. In the practice of medicine, there must always be a " first time " when a new method of medical treatment is tested, a new operation performed, a new remedy employed. Whether the procedure pertain to medicine or surgery, so long as the amelioration of the patient is the one purpose kept in view, *it is legitimate treatment.* The motive determines the morality of the act.

II. Now human vivisection is something quite different. It has been defined as " the practice of subjecting to experimentation human beings—men, women, or children, usually inmates of public institutions—by methods liable to involve pain, distress, injury to health, or even danger to life, without any full, intelligent, personal consent, *for no object relating to their individual benefit, but for the prosecution of some scientific inquiry.*"

The distinction is a perfectly clear one. Under the term " human vivisection " only those experiments are included which have some of these characteristics:

1. *The object is scientific investigation, and not the personal welfare or amelioration of the individual upon whom the experiment is made.*

2. The experiment is liable to cause some degree of pain, discomfort, distress, or injury to the health, or danger to the life of the person upon whom it is performed. The defence often made that no real injury resulted from the experiment, cannot palliate the offence against personal rights.

3. The experiment is performed without the intelligent, and full consent of the individual experimented upon. Such legal consent of course it is impossible to obtain from children, from the feeble-minded, or from lunatics in public institutions.

It is the purpose of this chapter to demonstrate that such experiments upon human beings have been performed. Naturally, it will be impossible to quote the cases in full. Enough, however, will be given to prove that the charge of human experimentation is not the exaggeration of ignorance or sentimentality; that such methods of research have been practised upon the sick, the friendless, the poor in public institutions, without their knowledge or intelligent consent; that they are in vogue even in our own time; and that hospitals and institutions, founded in many cases, for charitable purposes, have lent their influence and aid in furnishing either victims or experimenters.

Commenting upon certain human vivisections in Germany, the *British Medical Journal* declared in its editorial columns:

"Gross abuses in any profession should not be hushed up, but should rather be made public as freely as possible, so as to rouse public opinion against them and thus render their repetition or spread impossible. And therefore we have reason to thank the newspaper *Vorwärts* for dragging into light the experiments made by Dr. Strubell on patients. . . . The whole

medical profession must reprobate cruelties such as these perpetrated in the name of Science."[1]

It is this sentiment which justifies present publicity. The cases to which attention will be directed are not many; but they suffice to illustrate the practice, and to enable the reader to decide whether such experiments should meet approval or condemnation.

I. The Case of Mary Rafferty.

An instance of human vivisection which ended by the death of the victim, occurred some years ago in the Good Samaritan Hospital in Cincinnati. It would be difficult to suggest a name for a hospital more suggestive of kindly consideration for the sick and unfortunate: and to this charitable institution, there came one day a poor Irish servant girl by the name of Mary Rafferty.

She was not strong, either mentally or physically. Some years before, when a child, she had fallen into an open fire, and in some way had severely burned her scalp. In the scar tissue an eroding ulcer—possibly of the nature of cancer,—had appeared; and it had progressed so far that the covering of the brain substance had been laid bare. No cure could be expected; but with care and attention she might possibly have lived for several months. We are told that she made no complaint of headache or dizziness; that she seemed "cheerful in manner," and that "she smiled easily and frequently,"—doubtless with the confidence of a child who without apprehension of evil, feels it is among friends. The accident, however, had made her good "material"; she offered opportunity for experimenta-

[1] *British Medical Journal*, July 7, 1900, p. 60.

tion of a kind hitherto made only upon animals. "It is obvious," says the vivisector, "that it is exceedingly desirable to ascertain how far the results of experiments on the brain of animals may be employed to elucidate the functions of the human brain."[1]

At the outset the experiments seem to have been somewhat cautiously made. Nobody knew exactly what would be the result. The experimenter began by inserting into Mary Rafferty's brain, thus exposed by disease, needle electrodes of various lengths, and connecting them with a battery. As a result, her arm was thrown out, the fingers extended, but in the brain substance no pain was felt. Presently, as the experimenter grew bolder, other phenomena appeared. The vivisector shall tell the story in his own words:

"The needle was now withdrawn from the left lobe, and passed in the same way into the (brain) substance of the right. . . . When the needle entered the brain substance, *she complained of acute pain in the neck. In order to develop more decided reactions,* the strength of the current was increased by drawing out the wooden cylinder one inch. When communication was made with the needles, *her countenance exhibited great distress,* and she began to cry. Very soon, the left hand was extended as if in the act of taking hold of some object in front of her; the arm presently was agitated with clonic spasms; her eyes became fixed with pupils widely dilated; lips were blue, and *she frothed at the mouth; her breathing became stertorous; she lost consciousness and was violently convulsed.* The convulsion lasted five minutes, and was succeeded by coma. She returned to consciousness in twenty minutes from the beginning of the attack."

The experiment was a success. Upon the body of the poor servant girl, the distinguished vivisector had

[1] This case, under the significant title, "*Experimental Investigations into the Functions of the Human Brain,*" is related at length in the *American Journal of the Medical Sciences,* vol. 93 (N.S., 67).

produced the " violent epileptiform convulsion " which Fritsch and Hitzig and Ferrier had induced in animals, by the same method of experimentation.

There are those who feel that further vivisecting should have then ceased, and that Mary Rafferty should have been allowed to die in peace. Such views, however, were not permitted by the experimenter to interfere with his zeal for scientific research. Other " observations " were made, and the needles were again passed into the brain, evoking almost the same phenomena. The final experiments were thus described by the vivisector:[1]

" Two days subsequent to observation No. 4, Mary was brought into the electrical room with the intention to subject the posterior lobes (of the brain) to galvanic excitation. The proposed experiment was abandoned. *She was pale and depressed; her lips were blue, and she had evident difficulty in locomotion.* She complained greatly of numbness. . . . On further examination, there was found to be decided *paresis* and rigidity of the muscles of the right side. . . . She became very pale; her eyes closed; and she was about to pass into unconsciousness, when we placed her in the recumbent posture, and Dr. S. gave her, at my request, chloroform by inhalation.

" The day after observation No. 5, *Mary was decidedly worse.* She remained in bed, was stupid and incoherent. In the evening she had a convulsive seizure. . . . *After this, she lapsed into profound unconsciousness, and was found to be completely paralyzed on the right side.* . . . The pupils were dilated and motionless."

When did death come to her release ? We do not know; the omission is significant; it may have been within a few moments. The next sentence in the report is headed by the ominous word, " *Autopsy.*" The brain was taken out, and the track of the needles

[1] Italics not in original.

traced therein. One needle had penetrated an inch and a half. There was evidence of "*intense vascular congestion.*"

In cases like this, the investigation of a coroner apparently is not required. The experimenter himself was the physician to the hospital. He tells us of course that Mary's death was due to an extension of the disease, for the relief of which she had been led to the "Good Samaritan Hospital." Of the real cause of death, there was apparently but little doubt among scientific men. An English vivisector, Dr. David Ferrier, whose experiments upon monkeys had perhaps first suggested their repetition on a living human brain, questioned somewhat the propriety of the American experiments. In a letter to the *London Medical Record*, he referred to "the depth of penetration of the needles"; the "occurrence of epileptiform convulsions *from the general diffusion of the irritation when the currents were intensified*," and declared that the "*epileptic convulsions and ultimate paralysis* are clearly accounted for by the inflammatory changes" thus induced.

That the experiments had been to some extent injurious to his victim, the vivisector himself, in a letter to the *British Medical Journal*, very cautiously admitted.[1] He regretted, he said, that the new facts which he had hoped would further the progress of Science were obtained at the expense of *some* injury to the patient. She was, however, "*hopelessly diseased*," —as if that fact tended to justify her martyrdom! "*The patient consented to have the experiments made.*" Is not this excuse the very height of hypocrisy? Twice,

[1] *British Medical Journal*, May 30, 1874, p. 727.

he had stated in his report of the case, that the young woman was "*rather feeble-minded*"; and now that she was in her grave, he suggests that this poor, ignorant, feeble-minded servant-girl was mentally capable of giving an intelligent consent to repeated experiments upon her brain, the possible result of which even *he* could not foresee!

Who made these experiments? It was Dr. Roberts Bartholow, at that time the physician of the "Good Samaritan Hospital" in Cincinnati. His biographer says that he gained no credit "for his candour in reporting the whole affair,"—a hint, the significance of which for future experimenters, it is not very difficult to perceive. Yet his treatment of Mary Rafferty was no bar to his professional advancement. Not long after his victim was in her grave, one of the oldest medical schools in the country,—Jefferson Medical College of Philadelphia—offered him a professor's chair; and for several years he was Dean of the medical faculty of that institution.

It might seem impossible that any physician of the present day would care to come forward in defence of this experiment. Yet forty years after the deed was perpetrated, such justification was apparently attempted in an American journal, and republished in a pamphlet issued by the American Medical Association.[1] It would seem at the outset that only by suppression of the worst facts relating to the case, could any defence be essayed. *Was there any such suppression of material facts?* Let us see.

[1] "The Charge of Human Vivisection," by Richard M. Pearce, M.D., *Journal of the American Medical Association*, February 28, 1914.

Did any injury to Mary Rafferty result from these experiments upon her brain? Bartholow himself admits some injury; he says that to repeat the experiments "would be in the highest degree criminal." The modern apologist, however will have it otherwise. At the beginning of the experiment, she smiled as if amused; and this, he tells us, "shows that she did not object, that the pain was not severe, *and that no harm was done her.*" Is this a fair summary of the symptoms elicited during these experiments upon the brain? Why did the apologist mention only the "smile," and neglect altogether to mention the other symptoms reported by Dr. Bartholow? Why does he pass in silence her complaint of "*acute pain in the neck,*" the "*great distress*" *exhibited, the arm agitated with clonic spasms, the fixed eyes, the widely dilated pupils, the blue lips, the frothing at the mouth, the stertorous breathing, the violent convulsion* lasting for five minutes and the succeeding unconsciousness lasting for twenty minutes? Why does the apologist leave unmentioned the symptoms following the subsequent experiments,—the pallor and depression, the blue lips, the difficulty in locomotion, the decided paresis and rigidity of muscles, the profound unconsciousness, *the final paralysis?* Do omissions like these suggest an ardent desire to present the whole truth of the matter for the information of the public?

The defender of the experiments tells us:

"It is not an uncommon procedure in neurologic surgery, to stimulate after operation, in conscious patients, certain areas of the brain. This procedure is a familiar one to all neurologists, and it is *therefore difficult* to understand why so much has been made of these early observations in Cincinnati."[1]

[1] Italics not in original.

Aside from the astounding confession contained in this admission of familiar procedure, it is difficult to understand what is meant by this paragraph. Is it a suggestion that these experiments upon Mary Rafferty were observations following a remedial surgical operation? It is surely impossible that this can be the meaning; for in the original account of the "Investigations into the functions of the human brain," there is not a line in support of such hypothesis. The reader may make his own interpretation of a paragraph which seems exceedingly obscure.

No apology for these experiments could be complete, which did not refer to the alleged "consent." It is thus presented:

> "If the patient under these circumstances consented to the observations described, it would appear to be a matter between herself and the physician making the observations."

This is the view of the matter which the apologist invites us to accept. On the one side, stands a poor, ignorant, feeble-minded Irish servant girl, full of faith and implicit trust in the benevolence of those about her; on the other a learned scientist, eager, as he says, "to ascertain how far the results of experiments on the brains of animals may be employed to elucidate the functions of the human brain"; and her "consent" to procedures the purpose and dangers of which she knows nothing,—to experiments involving her life, are suggested as a justification of whatever was done, and as a matter with which Society need have no concern!

Upon such methods of vindication every intelligent reader may form his own judgment. He will doubtless reach the conclusion that such vital omission of essential

facts,—no matter whether accidental or intentional,—absolutely nullifies the value of the entire apology. Let us hope that the next defender of these experiments, writing not only for the instruction of the medical profession but also for the general public, will proceed along somewhat different lines; that every symptom which Bartholow mentions, he will mention also; that if he speaks of the "*consent*" of the victim, he will frankly tell us that it was the consent of one whom the experimenter himself called rather "feeble-minded"; and that if he thinks other palliating circumstances exist, he will at least graciously furnish us with references to the evidence presented by the experimenter, upon which he grounds his belief.

II. Experiments with Poison.

Of all experimenters upon patients in hospitals, probably one of the boldest was Dr. Sydney Ringer, physician to the University College Hospital in London. His position in this institution gave him a peculiarly favourable opportunity for the utilization of the human "material" under his care. The experiments upon his patients were frankly reported by himself, and were published in his well-known work on Therapeutics.[1] For the most part these experiments were made with poisonous drugs. Are we justified in classing them as human vivisections? If in any case, the drug can be shown to have been administered for the welfare of the patient, it was legitimate medical treatment, to which

[1] "Handbook of Therapeutics," by Sydney Ringer, M.D. Eighth edition, William Wood and Co., New York.

criticism does not apply. Were the drugs so administered? The experimenter shall describe his work in his own language.

Poisoning with Salicine.

"In conjunction with Mr. Bury, I have made some investigations concerning the action of salicine on the human body, *using healthy children for our experiments*, to whom we gave doses sufficient to produce toxic (poisonous) symptoms. We tested the effects of salicine in three sets of experiments *on three healthy lads*. To the first two, we gave large doses, and produced decided symptoms. . . . Under toxic (poisonous) but not dangerous doses, the headache is often very severe, so that the patient buries his head in the pillow. There may be very marked muscular weakness and tremour. . . ."

Another " set of experiments " was made on a boy ten years old, who had been brought to the hospital to be treated for belladonna poisoning. " Our observations," said Dr. Ringer, " were not commenced *till some days after his complete recovery*." Among effects of the experiment was a severe headache,—" so severe that the lad shut his eyes and buried his head in his arm . . . became dull and stupid, lying with his eyes closed. . . ."

Other experiments were made upon a boy only nine years old, almost well from an attack of pneumonia, the temperature having become normal over a week before. Dr. Ringer's experiment went so far as to give him apparently considerable apprehension. He speaks of the flushed face, the trembling hand, and lips, the laboured breathing, the spasmodic movements of limbs.

" These symptoms were at their height at midday, and were so marked, and the pulse and respirations so quick, that we must confess we felt a little relief when the toxic (poisonous) symptoms

which became *far more marked than we expected,* abated; not that at any time the boy was dangerously ill; but as the symptoms progressed, after discontinuing the medicine, *we did not know how long and to what degree they might increase.*" (!)

What shall be said of experiments like these, made upon children who had almost or quite recovered from ailments for which medical advice was sought?

Poisoning with Ethyl-Atropium.

This drug has no recognized medical use. In order to make experiments with it upon patients under his care, Dr. Ringer was obliged to have it specially manufactured. He refers to "our experiments upon man," and states that the poisonous substance

"produces decided but transient paralysis, *the patient being unable to stand or walk,* and the head dropping rather toward the shoulder or chest, and the upper eyelids drooping." [1]

Experiments with Tartar-Emetic, or Antimony.

Of this poison, an American authority tells us that "the fraction of a grain" may be followed by a fatal result. Dr. Ringer states, nevertheless, that,

"*To a strong young man,* I gave tartar-emetic in ½-grain doses every ten minutes for nearly seven hours, *inducing great nausea and vomiting* with profuse perspiration." [2]

Twenty-one grains of antimony administered to "a strong young man," though a fatal result may be induced by a fraction of a single grain!

[1] Ringer's "Therapeutics," p. 534. [2] *Ibid.*, p. 273

Poisoning with Alcohol.

With this substance, Dr. Ringer tells us he made a great many observations "every quarter of an hour for several hours *on persons of all ages*. . . . After poisonous doses, the depression (of temperature) in one instance reached nearly three degrees."

Does this sinister confession mean that even infants were the objects of his scientific zeal? It is certain that some children were subjected to this experiment, for he says:

"In a boy aged ten, who had never in his life before taken alcohol in any form, I found through *a large number of observations*, a constant and decided reduction of temperature."

Is there any parent who would be willing to have his ten-year-old boy subjected to an experiment like this?

Poisoning with Nitrate of Sodium.

"To eighteen adults, fourteen men and four women, we ordered 10 grains of pure nitrate of sodium in an ounce of water, and of these, seventeen declared they were unable to take it. . . . One man, a burly strong fellow, suffering from a little rheumatism only, said that after taking the first dose, he felt giddy as if he 'would go off insensible.' His lips, face, and hands turned blue, and he had to lie down an hour and a half before he dared moved. His heart fluttered, and he suffered from throbbing pains in the head. He was urged to try another dose, but declined on the ground *that he had a wife and family*. . . ." [1]

When this account of hospital experimentation first appeared in the *Lancet*, another medical journal made the following comment:

[1] The London *Lancet*, November 3, 1883, p. 767

"In publishing, and indeed, in instituting these reckless experiments on the effect of nitrate of sodium on the human subject, Professor Ringer and Dr. Murrill have made a deplorably false move, which the ever watchful opponents of vivisection will not be slow to profit by. . . . It is impossible to read the paper in last week's *Lancet* without distress. Of eighteen adults to whom Drs. Ringer and Murrill administered the drug in 10-grain doses—all but one avowed they would expect to drop down dead if they ever took another dose. One woman fell to the ground, and lay with throbbing head and nausea for three hours; another said it turned her lips quite black, and upset her so that she was afraid that she would never get over it. . . . One girl vomited for two hours and thought she was dying. All these observations are recorded with an innocent *naïvete* as though the idea that anyone could possibly take exception to them were far from the writers' minds. But whatever credit may be given to Drs. Ringer and Murrill for scientific enthusiasm, it is impossible to acquit them of grave indiscretion. *There will be a howl throughout the country if it comes out* that officers of a public charity are in the habit of trying *such useless and cruel experiments* on the patients committed to their care. . . ."[1]

"*Cruel and useless experiments on patients*"—that was the judgment of a medical journal of the day. Any stronger condemnation now is hardly necessary.

What is the judgment of the reader upon investigations of this character? Here we have a physician making use of the bodies of his patients for the testing of poisonous drugs, apparently without the slightest regard for the poor and ignorant fellow-beings who had confidently placed themselves under his care. Can such experimentation as this be termed anything but human vivisection? Once we admit that patients in hospitals have no rights superior to scientific demands, and there is hardly a limit to which such experimentation may not be carried on the poor, the ignorant, the feeble-minded and the defenceless.

[1] *Medical Times and Gazette*, November 10, 1883.

III. Experiments involving the Eye.

Recent experiments with tuberculin, made upon the eyes of children and other patients in public institutions, seem in many cases to have been carried to an extent not easily justified by ordinary ethical ideals. It is impossible to quote all the cases of this phase of human experimentation; but enough can be given to afford any reader the opportunity of judging the morality of the practice.

The experiments in question had one or more of the following characteristics, distinguishing them from ordinary medical treatment:

1. They were made indiscriminately upon large numbers of children or adults, who were under treatment for various ailments.

2. They appear to have been purely experimental in character, and without purpose of individual benefit.

3. They seem to have involved in some cases considerable discomfort or pain and the risk of irreparable injury to the sight.

4. Dying children apparently were not exempt from experimentation.

A recent medical writer, defending the experiments, points out that the tuberculin test could not convey the infection. The test, he says,

> "depends on the principle that if a fluid in which tubercle bacilli have grown, and which therefore contains the chemical products of their growth is injected into an animal or person suffering from tuberculosis, a transient increase of temperature occurs, and constitutes the chief sign of a positive reaction. . . . Later it was found that if the diluted tuberculin was placed on

the surface of the eye, there followed in tuberculous persons, a reddening or congestion of the eye, which might go on to the stage of mild conjunctivitis." [1]

Is this a fair summary of the dangers of the eye-test? Let us see what the experimenters tell us.

In the *Archives of Internal Medicine* for December 15, 1908, two experimenters describe their work. When a drop of tuberculin solution is instilled into the eye of certain cases, there occurs, they say, an infection which varies in intensity in different individuals, "usually attended by lachrimation and moderate fibrinous or fibro-purulent exudation *which may go on to profuse suppuration.*" This "profuse suppuration" is something rather more severe than the symptoms described by the apologist just quoted.

The experimenters say:

"Practically, all our patients were under eight years of age, and all but twenty-six of them were inmates of St. Vincent's Home, an institution with a population of about four hundred, *composed of foundlings, orphans, and destitute children.* The cases in the Home were tested in routine by wards, *irrespective of the conditions from which they were suffering,* and in the great majority of instances without any knowledge of their physical condition prior to, or at the time that the tests were applied. We purposely deferred the physical examination of these children until after the tests had been applied."

Would any medical practitioner, called to the house of a wealthy man to examine his ailing child, purposely defer its physical examination until after this eye-test had been applied?

Many of the children were suffering from various ailments at the time this test was made. Some had

[1] *Journal of the American Medical Association,* February 28, 1914.

rickets, some typhoid fever, some whooping-cough, pleurisy, pneumonia or heart disease. Some of them were already near their end; in one case we are told that the " tests were applied within eight days of death "; upon another emaciated infant, the test was " applied three days before death." Infancy earned no immunity from experimentation, for the eye-test was said to have been applied " to seventeen infants, ranging in age from four weeks to five months." In this group of cases, one infant was tested within the last twenty-four hours of its pitiful and painful existence.

What were the possible consequences of these tests upon the sight of the orphans and foundlings of St. Vincent's Home ? The experimenters frankly confess that at the outset they did not know.

" Before beginning application of the conjunctival test, *we had no knowledge of any serious results from its use*. . . . It has the great disadvantage of producing a decidedly uncomfortable lesion, and it is not infrequently followed by serious inflammations of the eye, which not only produce great physical discomfort and require weeks of active treatment, *but which may permanently affect the vision, and even lead to its complete destruction*. . . . We have had a number of verbal reports of eye complications, some of them relating to very serious conditions; and we are sure they are much commoner than the references we have communicated would indicate. . . . In fact we are strongly of the opinion that any diagnostic procedure which will so frequently result in serious lesions of the eye has no justification in medicine. . . ."

The conclusions concerning the occasionally disastrous consequences of this eye-test were shortly confirmed by other experimenters. During the following year, two Massachusetts physicians reported a study made in " the out-patient clinic of the Carney Hospital

and the Massachusetts Charitable Eye and Ear Infirmary," and they add: " We are most indebted to the staff of the latter institution for allowing us to make use of their material. . . . We have discarded the conjunctival test, *as being occasionally productive of disastrous results.*"

In May, 1909, two Baltimore physicians reported their trials with two forms of the tuberculin tests, " the result of over a year of experience with patients coming to the Phipps Dispensary of the Johns Hopkins Hospital." A year later they make an additional report.

" In May, 1909, we reported the results of the conjunctival and cutaneous test in 500 patients. The present report deals with 1,000 additional patients to whom these tests were administered, and who formed *the unselected material of an ambulant clinic,* the Phipps Dispensary of the Johns Hopkins Hospital."

They, too, suggest the necessity for caution in making this experiment. If a drop of the tuberculin, first in one eye and then in the other, produced no reaction,

" we refrained from further instillations, fearing the possible intensity of a reaction consequent upon a second instillation of tuberculin into an eye. Our fear is based on evidence, gathered accidentally, that a second instillation may give a positive and even a severe reaction in a case in which a similar test gave a negative result."

In January, 1909, one of the professors connected with the College of Physicians and Surgeons, New York, published a " Report upon one thousand Tuberculin tests in young children." He says:

" The observations included in the following report were all made at the Babies' Hospital upon ward patients. Very few of the children were over three years of age, the majority being under two years. . . . In the early part of the year, unless

some positive contra-indication existed, some test, more frequently the eye-test, was used as a routine measure in order to determine whether and under what circumstances reactions were obtained in *healthy children,* or in those at least *presumably non-tubercular.*" [1]

This is perfectly plain. Healthy children, or children presumably without any symptoms of tuberculosis, were experimented upon in order to see whether a positive reaction could be obtained. Of 555 cases of infants subjected to this test, who were presumably not tubercular, only two gave a positive reaction, although there were seven cases in which the reaction was doubtful.

We are told by this writer that " care was taken not to use tuberculin in an eye which was the seat of any form of disease, tuberculous or otherwise," and to this precaution, he ascribes his freedom " from unpleasant results." He insists that " on account of the kind of observation necessary, and the possible dangers connected with the eye-test, it is not wise to employ it indiscriminately, as among the out-patients of a hospital." Undoubtedly this is true; and he repeats the advice: the ophthalmic test " *cannot well be used in ambulatory patients.*" Yet we have just seen that the test *was* thus used in the large number of cases " who formed the unselected material of an ambulant clinic " in another well-known hospital dispensary.

The final judgment of the experimenter does not appear to be entirely favourable to the test involving the eye, though he insists that with proper precautions it is safe. Taken apart from the physical signs and

[1] *Archives of Pediatrics,* January, 1909.

general symptoms, the tests may mislead. "Some failures and some unexplained reactions occurred with all the tests." Even though safe, yet

"an intense or prolonged reaction sometimes occurs which is not pleasant to see; besides, in pathological conditions of the eye, *disastrous results may follow. The eye is too delicate and important an organ to be used as a test when any other will answer quite as well.*"

With this sensible conclusion it is quite impossible to disagree.

Another question is of importance. For these experiments upon the eye, *were dying children ever used as material?*

Apparently, there can be no doubt of the fact. The experimenter distinctly states that "*dying children*, or those who were extremely sick did not as a rule, react to any of the tests." The assertion is repeated: "In no case were positive reactions obtained in *dying children.*"

In one of the tables, there is also a reference to dying children.

We are told that "the hands of the children were confined during the first twelve hours, to prevent any rubbing of the eye."

Can it be that dying children were thus treated? We are not told to the contrary. Yet it would seem that impending death might well have conferred immunity, not merely from such restraint but from the entire experiment. The thought of a dying child with fettered hands, is not a picture upon which the imagination would willingly dwell.

Upon these experiments involving the eye, what judgment is a plain man entitled to make?

In the first place, he should draw a clear distinction between the experiments made upon tuberculous patients, and those made upon healthy children. Among the large number of experiments, it is possible that some were made upon carefully selected cases for the personal benefit of the individuals concerned. Regarding these, opinions may differ as to expediency; but they belong to the rightful province of medical treatment,—wise or otherwise. But if these tests were applied without such discrimination, without previous inquiry into their condition; if they were made only upon the eyes of the orphans and foundlings, and the poor in hospital and dispensary, and not upon the children of the wealthier classes; if in large numbers, men, women and children were made " the unselected material " for tests wherein their individual welfare was not sought, in experiments which not only " produced great physical discomfort " but were liable also to " permanently affect the vision, and even lead to its entire destruction," it would seem impossible to regard them with admiration or approval. Would any of us care to have his own dying child, separated from its mother, and with hands confined, made the " material " for any such experiment ? Should we care to have anyone dear to us, subjected to the risks which seem to have been so freely imposed upon the unfortunate, the ignorant, the poor ? That is the test by which ultimately these experiments will be judged.

IV. The Rockefeller Institute, and Experimentation on Human Beings.

In public esteem, the *Rockefeller Institute* undoubtedly occupies an exceptionally high position. It would seem to be generally believed, that by reason of experiments made within its walls upon the lower animals, discoveries of the utmost value to the human race are being added to the resources of medical science. Possibly, a careful analysis of its work might disprove this belief, but that is aside from present inquiry. A more important question confronts us,—the extent to which under the authority of this Institution, human beings as well as animals have been used as "material" for researches altogether unconnected with their personal benefit. If such experiments have in truth been made under the authority of the Rockefeller Institute, it would seem to be of the utmost importance that the exact truth be made known. It is not always easy to state medical facts in popular language, but the attempt shall be made.

When Columbus returned from his discovery of a new world, it is now generally believed that he brought to Europe the germ of one of the most terrible diseases which have ever afflicted the human race. The extent of its malignancy has only been known within the past century. The unborn infant may be touched by it with the possibility of great suffering, and the probability of an early death. There is not an organ of the human body which may not become the seat of its ravages. The majority of other infectious diseases leave their

victim after a time; this makes its home within the body and may manifest its malignity after almost a lifetime of quiescence. In its contribution to the sum total of suffering which disease has occasioned the human race, it is probable that with one exception, syphilis stands above every other human ailment.

On March 3, 1905, a young German biologist by the name of Schaudinn discovered under the microscope what is now generally believed to be the germ of this terrible disease. It is a minute, spiral-shaped organism, with six or eight curves, and capable of movement in space. Its place in the scheme of existence is not wholly certain, but the probability seems that it is a protozoan, belonging to the lowest form of animal life. Its very simplicity makes it appalling; we do not understand how anything so innocent in appearance, can occasion such terrible ravages. In the course of the evolution of life how came it into being? We can only surmise. But once having gained a foothold in the body of a human being, the minute organism begins to multiply: and penetrating to any part of the body, it induces the ravages of a destroyer despite all the opposing defences which Nature may raise against it. The discoverer first called it the "*Spirochæte pallidum*," but later invented a new name—"*Treponema pallidum*"—by which it is at present generally known. It is almost certain that in this minute organism, invisible to the naked eye, we have the causative agent of one of the great destroyers of the human race.

A Japanese physician, connected with various phases of research work in the *Rockefeller Institute* (Dr. Hideyo Noguchi), believed it would be possible to devise a

method for detecting the existence of these germs of syphilis in certain latent and obscure cases, where the disease was merely suspected. He had no thought of inventing a cure for the disease; it was a method of detection only. By ingenious procedures which it is unnecessary here to describe, Dr. Noguchi succeeded in cultivating these germs *outside the human body;* and after grinding them in a sterile mortar, and subjecting them to heat with other manipulations, he found himself finally in possession of an extract or emulsion to which he gave the name of "*luetin.*" It contains the germs of syphilis; but they are intended to be *dead germs.* The experimenter himself says:

"I have proposed the name *luetin* for an emulsion or extract of pure culture of *Treponema pallidum,* which is designed to be employed for obtaining in suitable cases, a specific cutaneous reaction that may become a valuable *diagnostic* sign in certain stages or forms of syphilitic infection."

Now, if a drop of this *luetin* be introduced beneath the skin of a child who has inherited the disease, or of a person who has suffered from its obscurer symptoms, there may be produced a "reaction." This may take the form of "a large, indurated, reddish papule" which in a few days becomes of a dark, bluish-red colour; or the inflammation may be of a severer type, resulting in a "pustule." A positive result is more frequently obtained when the disease is of long standing, or comparatively inactive. But may not this "reaction" occur in every case, whether or not the individual has ever been affected by the disease? Anyone can see that if this "reaction" manifests itself in *all* cases, the luetin test has no value whatever. And it was in the prosecution

of this phase of research that certain experiments upon human beings were made, which have been criticized. Dr. Noguchi and other physicians injected this *luetin* emulsion containing the dead germs of syphilis, not only into persons presumed once to have been affected by the loathsome disease, but also into the bodies of 146 other persons, *including children, entirely free from the disease.* It would seem that he was advised by an American physician to make his experiments on human beings rather than upon animals. He tells us:

"... In 1910-11, I commenced my experimental work on rabbits. ... While I was still working with the animals, *Professor Welch suggested that I made the test on human subjects.* Through his encouragement, I commenced the work at once at different dispensaries and hospitals, with the co-operation of the physicians in charge."

Whatever criticism may attach to these experiments, it ought not to fall upon the Japanese investigator, encouraged and supported as apparently he was, by both Christian and Jewish physicians. In appreciation of the assistance afforded him at various charitable institutions, Dr. Noguchi says:

"Through the courtesy and collaboration of—

Dr. Martin Cohen ..	HARLEM HOSPITAL, RANDALL'S ISLAND ASYLUM, and NEW YORK OPHTHALMIC AND AURAL INSTITUTE;
Dr. Henderson ..	STATE HOSPITAL, WARD'S ISLAND, N.Y.;
Dr. Lapowski ..	GOOD SAMARITAN DISPENSARY;
Dr. McDonald ..	KING'S COUNTY HOSPITAL;
Dr. Orleman-Robinson	NORTH-WESTERN CLINIC, NEW YORK POLYCLINIC;
Dr. Pollitzer ..	GERMAN HOSPITAL;
Dr. Rosenoff ..	KING'S PARK STATE HOSPITAL;

Dr. Satenstein .. City Hospital, Blackwell's Island, N.Y.;
Dr. Schmitter .. Capt., U.S. Army, Fort Slocum;
Dr. Schradieck .. King's County Hospital;
Dr. Charles Schwartz California;
Dr. Smith .. .. Long Island State Hospital;
Dr. Strong .. .. Manhattan Eye, Ear and Throat Hospital;
Dr. Swinburn .. Good Samaritan Dispensary;
Dr. Windfield .. King's County Hospital;
Dr. Wiseman .. King's Park State Hospital;
And the Hospital of the Rockefeller Institute for Medical Research,

I was enabled to apply the skin reaction to a number of human cases. . . . The total number of cases was 400." [1]

Four hundred patients in hospitals and dispensaries including the hospital attached to the Rockefeller Institute for Medical Research, were used as "*material*" for determining the value of a test for latent syphilis. Of these, 146 were healthy individuals, used as "controls."

Dr. Noguchi states that these "controls"

"include 146 normal individuals, chiefly children between the ages of two and eighteen years; and 100 individuals suffering from various diseases of a non-syphilitic nature. . . . In none was a positive *luetin* reaction obtained."

Other experimenters upon human beings have made reports of their investigations in the same direction. A physician of St. Louis in a medical journal, tells us of forty-four cases in which the Noguchi *luetin* was applied, and he expresses his obligation to eight physicians of that city (naming them), "for the privilege

[1] *Journal of Experimental Medicine*, vol. xvi. In the original, the names of the hospitals are somewhat obscured by being placed in brackets, and the paragraph made continuous; they are here printed in capitals, to afford the reader a better opportunity of giving these charitable institutions whatever credit is due them.

of using *their cases for the work.*"[1] Whether these "*cases*" were the private patients of the accommodating physicians, we are not informed. This experimenter had not completed his investigations and announced his intention of "trying it out thoroughly" in a certain St. Louis hospital, which he names.

The same experiments appear to have been made in other institutions. In the Bulletin of the Johns Hopkins Hospital for August, 1912, there appears an account of this luetin test, made upon patients suffering from such ailments as rheumatic fever, typhoid fever and consumption. We see that the practice has extended to some of the leading hospitals of the United States.

The defence of all hospital experimentation upon children and adults, other than procedures for their own benefit, is usually grounded upon (1) the absence of any severe injury, and (2) the value of the results obtained. The defenders of the Noguchi experiments insist that the disease was not transmitted; that there was no severe pain or permanent injury; and that the inoculation with dead germs of syphilis could not have caused an infection with the dread disease. This is probably true; although the excuse of painlessness cannot be fairly put forward regarding the tuberculin experiments upon the eye. But should we overlook the fact that these tests, at first were purely experimental in character? No absolute assurance of results could have been declared in advance; if certainty existed beforehand, what would be the use of experimenting upon so many human beings? Are

[1] *New York Medical Record*, May 25, 1912.

experiments upon man only reprehensible when injury follows? Do we apply this rule to the engineer of a passenger-train, who again and again runs by a danger-signal, and yet escapes a tragedy?

The utility of experimentation is urged. Only by experiments upon human beings, it is said, could the value of either the tuberculin test or the Noguchi emulsion be definitely determined. But surely every thinking man must realize that utility cannot exculpate, or justify the use of any method which is otherwise wrong in itself. A murder is not regarded as pardonable, because thereby the interests of religion are advanced. Dr. Noguchi for instance, admits that although it is almost certain that the germs which Schaudinn discovered and which he has isolated and grown outside the human body, are the cause of specific disease, yet scientific certainty can only be acquired by producing the ailment from the artificially cultivated germs. He says:

"While there are few, to-day, who would deny that the *Treponema pallidum* is the causative agent of syphilis, *yet the final proof can only be brought forth through the reproduction of syphilitic lesions by means of pure cultures of the micro-organism.*"[1]

A scientific experiment upon a human being of greater interest than this it is hardly possible to imagine. With germs invisible to the naked eye, grown in a flask, will some future experimenter be able to produce in a human being all the terrible symptoms of this worst scourge of the human race? That the experiment will be tried, there can be no doubt; experiments involving the inoculation of the same horrible disease,

[1] "Studies of the Rockefeller Institute," vol. xiv., p. 100.

have been made both in America and in Europe. But does anyone think that the utility of this suggested experiment of Dr. Noguchi would justify its being made upon an unsuspicious patient in a charity hospital? Would it be likely to meet general approbation, even in our day, if it were performed upon an infant in a Babies' Hospital? And yet why should it be criticized, if utility to science is a sufficient excuse?

It is a significant fact, that every writer who attempts to defend or to excuse the experiments here described and others of the same type, always evades the principal reason for their condemnation. The condemnation of what may be called "human vivisection" rests chiefly upon its incurable injustice.

All such experiments violate one of the most sacred of human rights. Every man, not a criminal, has the inherent right to the inviolability of his own body, except for his own personal benefit. Apply this to the experiments herein described.

They imply a suppression of the truth. Is it probable that any mother, bringing to a hospital her ailing child, would leave it there without apprehension if she were distinctly informed that when it had partly recovered, it would be used for experimentation relating to a test for syphilis?

They imply a phase of deception, so far as a formal "consent" is ever obtained without a full and complete statement of possible dangers. Can we imagine Mary Rafferty to have consented to Bartholow's experiments upon her brain, if, in full possession of her intellectual faculties, she had known—as he knew,—

what risks they involved? It is the performance of experiments upon dying children, upon infants for no purpose of individual benefit, upon men and women all unconscious of the character of the investigation; the imposition upon the ignorant and confiding of unknown risks; the utilization for experimentation under cover of treatment for their ailments, of the poor, the feeble-minded, the unfortunate, without their full, intelligent and adequate consent, that makes the practice abhorrent to every conception of morality, and every ideal of honour.

How such experiments are coming to be regarded, we may see in a recent article from the pen of Dr. Francis H. Rowley, president of the Massachusetts Society for the Prevention of Cruelty to Animals:

"The use of children in hospitals, or anywhere else, as material for experimentation is not to be tolerated for a moment, in our judgment, by any right-minded man or woman. Whatever is conscientiously done for the benefit of the child itself, to save it from disease or to lessen its suffering, though it may cause it temporarily more or less pain, is nothing against which objection should be made. But to use the child, even when no permanent harm may result to it, as a subject upon which to try out certain theories, or to test the efficacy of certain drugs, so long as this is not absolutely for the good of the individual child treated rather than for children in general, is abhorrent to the most of us. To cause a helpless baby one hour's distress, to say nothing of suffering, for the sake even of other children, when that baby has been brought to the hospital by its parents or guardians solely for what may be done for its benefit, we hold to be a breach of trust on the part of hospital authorities and physicians that hasn't the slightest defence either in morals or in law.

"We write these words not because we believe that any physician is so far fallen below the lowest levels of our common humanity as to inject into a defenceless child the active germs of a loathsome or possibly fatal disease, but because our moral sense

is outraged at any treatment of the child such as we should refuse to permit were the child our own. We believe the universal assertion of parents would be that, if having taken their child to a hospital for treatment, they learned that it had been used for experimentation, though no lasting harm could come to it from the experiment, someone would pay the penalty for the unwarranted deed, if money or influence or, these failing, muscle, could reach far enough to find the offender."

Does such condemnation of experimentation upon the hospital patient or children tend to block scientific advance? Not at all. A recent writer tells us that "once it is evident that man himself must be the experimental animal, the scientist volunteer is always ready." If this be so, why should not the human "material" be acquired always in a way to which the charge of unjust procedure would never be applicable? If assurance could have been given that the *luetin* test implied no risk of any kind, might not the Rockefeller Institute have secured any number of volunteers by the offer of a gratuity of twenty or thirty dollars as a compensation for any discomfort that might be endured? Of the thousands of medical students in the State of New York, are there not hundreds who would have offered with eagerness to submit to a test devoid of peril, in the interests of scientific research? And even if an experiment implied danger, might there not be sufficient compensation for all risks? Every year firemen lose their lives in the flames, and policemen are murdered. The compensation they receive induces them to incur risks that might not otherwise be assumed. A great theologian is said to have affirmed that a man, perishing from starvation, had the moral right to take a loaf of bread that did not

belong to him, if only thus he could preserve his life. Is Science ever in such straits of necessity that in a single instance it is obliged to take from any man his supreme right of inviolability, and to make its experiments within the wards of the hospital, upon the eyes of the dying, upon the bodies of the ignorant and the poor ?

There is yet another method by which perhaps we may test the morality of the practice. A great philosopher of another century seeking to find some criterion of man's duty toward his fellow-men, based obligation upon a universal law. " Act," said Kant, " as if the motive of thy conduct were to become by thy will a universal law." Suppose we apply this maxim of Kant to the use of human beings for research purposes. An experimenter in a hospital makes dying children his material. Is he willing that the maxim of his act should be universal, and apply to experiments upon his own child, when it lies at the point of death ? He plunges needle-electrodes into the brain of a simple-minded and perhaps friendless servant-girl. Can we imagine him willing that the motive of his deed should govern and justify experiments of the same kind made upon his mother or his wife ? Following Ringer, he tests the action of poisons upon patients in some hospital under his control. Would he be willing that the law be universal, and that the action of such drugs should first be tested upon himself ? He suggests the use of healthy children as " *controls* " in tests with the dead germs of a horrible disease. Is there anyone connected with the Rockefeller Institute, for example, who would be willing that such act should establish a uni-

versal precedent, and that his own children should be taken, and without his knowledge, made the " material " for such research ?

Admitting that some experiments upon human beings may be ethically permissible, and that other phases of such investigations are morally wrong, how are we to distinguish between them ? May it not be possible to indicate principles which would be generally accepted, according to which the line may be drawn ? Let us make the attempt.

I. Justifiable Experimentation upon Man.

1. All experiments made by intelligent and conscientious physicians or surgeons upon their patients for some definite purpose pertaining to the personal benefit of the patient himself, and when practicable, in case of risk, with his or her consent.

(*This rule is intended to include every possible experiment made by a medical practitioner for the benefit of the patient, with a distinct ameliorative purpose in view.*)

2. All experiments made with an intelligent purpose by a scientific man or medical practitioner upon himself.

3. All experiments made with their consent upon physicians, surgeons, pathologists, medical students or other scientific men, who, aware of the nature of the investigation and of possible results, voluntarily offer themselves as " material."

4. All experiments made upon men or women of ordinary intelligence who, having been fully informed of the nature of the investigation and of whatever

distressing or dangerous consequences are obviously liable to result, acknowledge the receipt of satisfactory compensation for all risks, and give in writing their full and free consent.

5. All psychological experiments or tests which involve neither fear, fright, nor mental distress of any kind.

II. Unjustifiable Experimentation upon Human Beings.

Experiments upon human beings which would seem to be immoral, because obviously a violation of human rights, are as follows:

1. *All experiments, tests or observations, liable to involve any degree of pain, discomfort or distress, made upon dying children, or children apparently near death, for any purpose other than their present personal relief.*

2. The use of new-born babes as material for research; the use as material for research of any other defenceless children, in orphanages, asylums, or in their own homes, for any purpose whatever other than the direct personal benefit of the child upon whom the experiment is made. Especially objectionable would seem to be experiments of this character made in connection with the study of syphilis, whether or not any obvious injury is the result.

3. All experiments liable to cause discomfort or distress, made without purpose of definite individual benefit upon the insane, the feeble-minded, the aged and infirm or upon other unfortunate human

beings, who, for any reason, are incapable of giving an intelligent consent or of adequately comprehending what is done to them.

4. All experiments of any kind, upon other adults, whether patients or inmates of public institutions or otherwise, if made without direct ameliorative purpose and the intelligent personal consent of the person who is the *material* for the research.

5. The experimental exploitation without their free consent, of men, temporarily under command or control of an authority which they have been led to suppose they are not at liberty legally to disobey.

Let us repeat. *There is no objection to experiments upon human beings, when there is no invasion of human rights.* The medical student, who, out of zeal for Science, offers his body for any experimental test; the patient in the hospital, who with adequate compensation for what he is asked to undergo, grants consent to some investigation which may help others, though not himself; the poor man who is satisfactorily compensated for all risks, and therefore willing to aid research,—such varieties of human experimentation do not necessarily offend the moral sense. It is the incurable injustice of experimentation upon infancy that can offer no protest but a cry; of experimentation upon the dying child, of experimentation upon the poor, the ignorant, the feeble-minded, the defenceless, — it is experimentation like this which surely deserves the condemnation of mankind.

What is the remedy for human vivisection? It

lies in such legislation as shall protect those who, because of infancy, or by reason of ignorance cannot effectively protect themselves. By penalties so heavy that they cannot be safely ignored, the State must forbid the iniquitous exploitation of man by man. No such law need interfere in the slightest degree with the rights of the true physician to aid his fellow-beings; nor can we doubt that the medical profession will finally favour a reform that will indicate the broad line of demarcation separating the unquestioned privilege from the unjustifiable abuse.

CHAPTER XIX

CONCLUSION

In the preceding pages, the attempt has been made to throw light here and there, upon a great and perplexing problem. It has been seen that concerning the past history of experimentation upon living beings, much ignorance still exists; that too implicit and unquestioning trust in the statements of those favourable to unlimited experimentation has, unfortunately, not always conduced to the attainment of truth; that misstatements tinged with inaccuracy have too frequently found acceptance; and that growing out of the unrestricted use of animals in scientific inquiry, the extension of the method, by the use of human material, in certain hospitals has become an accepted procedure.

It is, indeed, an ethical problem, that confronts society, to-day. It would be no less a problem, if every claim of utility made in behalf of human and animal experimentation were proven beyond the possibility of a doubt. Even then, the ethical question would persist. The ultimate decision regarding it remains the personal duty of every man.

Attention has been called, in the preceding pages, to many statements, which a close examination would

seem to prove to be misleading and inaccurate. But every discerning reader should recognize that inaccuracy or untruth does not imply the moral obliquity that pertains to intentional falsehood. An experimenter, for example, makes an assertion regarding the absolute painlessness of his vivisections. Such statement may be demonstrated, let us say, to be exceedingly doubtful, if not quite untrue. That is as far as legitimate criticism can easily go. It is quite impossible to demonstrate a conscious intent to deceive. To interpret motives, to impute falsehood is to go beyond facts into regions where facts are not to be found, except in exceedingly exceptional cases. One of the Royal Commissioners expressed this position very clearly. "While I feel bound," wrote Dr. George Wilson, "to accept the assurances of all the expert witnesses who appeared before us, as assurances of their honest conviction that vivisectional or cutting experiments can be, and are carried out without the infliction of pain from the moment the first wound is made, . . . I can only accept them *as opinions*, to which the greatest weight should be attached, *and not as statements of absolute fact* so far as specific instances are concerned." This is exactly the attitude for any critic of vivisection to take. A distinguished physician, testifying before the Commissioners, declared that it was entirely possible to keep a dog in a state of anæsthesia for a week, if necessary. Experimentation in this direction, in all probability would prove the assertion to be untrue, but although such demonstration would be proof of inaccuracy and carelessness, it could not justify, in any way, the charge of dishonourable motives. In no instance, therefore, in

the illustrations of inaccuracy given in the preceding pages, is there any imputation of perverse and intentional inveracity.

I have made sufficiently clear, I hope, my disagreement with the views of the extreme antivivisection party concerning all phases of biological experimentation. The weakest point in the antivivisection position has always seemed to me the condemnation of every kind of experimentation upon animals, however painless. Yet how is it possible to expect public agreement with this position in every case? A few weeks ago, it was announced in the public press, that in one of the departments of Columbia University in New York, a series of experiments were being made to determine, if possible, the comparative food value of two articles in general use. If, for instance, a certain number of mice were fed from day to day upon pure butter, and an equal number upon the artificial product known as "oleo-margarine," would there be any perceptible difference in growth and general condition, and, if so, in favour of which group? This is an experiment upon animals; but it is one against which it would be difficult to bring forward any objection which the general public would very eagerly endorse. Distinctions must be made, between that which is cruel and that which is humane. "*Against perfectly painless experiment*," said Sir Benjamin Ward Richardson, "carried out for purely exceptional and great objects by men who themselves regret the necessity or expediency, and who only act under a strict sense of duty, no reasonable mind can raise an objection."

On the other hand, let me reiterate acknowledgment of the vast indebtedness which the cause of humaneness owes to opponents of all vivisection. Always and everywhere, the extremist helps in the progress of reform. But for a few hated and despised abolitionists, negro slavery might still be a recognized American institution; it was not Henry Clay or Daniel Webster who did most to hasten its downfall. That antivivisectionists have made mistakes, perhaps their most ardent advocate would be willing to concede. On the other hand, how great has been their service! But for extremists such as Frances Power Cobbe of England and Elizabeth Stuart Phelps-Ward of America and a host of others whose hearts were aflame with indignation at cruelty and at the seeming duplicity which denied its existence, the whole question would have sunk into the abeyance in which in France or Germany, it to-day exists. They kept it alive. And what have not the antivivisectionists suffered by detraction, by ridicule, by misrepresentation and personal abuse! The most eloquent woman to whom I have ever listened, English only by adoption, faced without flinching some of the most skilled vivisectors and controversialists of Great Britain, who endeavoured in vain to weaken the force of her testimony; and the examination of Miss Lind-ap-Hageby by certain of the vivisecting members of the Royal Commission seems to me a more brilliant instance of the presentation of ideals under adverse circumstances than is afforded by any similar examination of man or woman in modern times. Personal disagreement with universal condemnation of all vital experimentation has been sufficiently stated; but one view of the antivivisectionists applies

equally to prohibition of painful experiments. "I believe," said Miss Lind, "that the abolition of vivisection will be accompanied by great changes and great developments in the whole science of medicine; that new methods of healing will come in, and higher methods, as we know that the coarser medication and the coarser drugging are going out of fashion."[1] The same view was expressed by Dr. Kenealy, another witness, regarding the prohibition of all animal experimentation. "I think it would give the finest possible impulse to medical science; that we are surrounded by all these problems of disease and degeneration and suffering in human kind; and that if we were to devote our attention to man, and to all the valuable human material surrounding us, instead of wasting valuable time and talent on dogs and guinea-pigs, we should make rapid and immense advance in the relief of human suffering."[2] Somewhat the same sentiment has been expressed by others not opposed to animal experimentation. "It may be admitted," said Sir Benjamin Ward Richardson, whose scientific zeal, no one can question, "that whether painful experimentation be useful or useless, it has had one indifferent effect; it has diverted the minds of men too strongly from methods of research that not only lie open to the curious mind, but which lie temptingly open." And speaking of medical treatment for disease, he says: "Treatment at this time is a perfect Babel. . . . Two men scarcely ever write the same prescription for the same disease or the same symptom. I have watched the art of prescribing for fifty years, and I am quite sure that divergence of treatment is at this moment far

[1] Evidence before Royal Commission, Q. 7,627. [2] *Ibid.*, Q. 6,776

greater than it ever was in the course of that long period. The multiplication of remedies, begotten of experiment, is the chief reason of so much disagreement. . . . The modern student has before him a new duty. The experiment of experiment that lies before him therapeutically, is to learn what diseases will recover by mere attention to external conditions without any medicines, and what will not."[1]

The unpleasant accompaniment of all criticism is misunderstanding. A protest, a remonstrance of any kind can gain a hearing only after it has been repeated again and again, and even then it is quite as liable as otherwise to be wholly misconstrued. It has been with very great regret that for many years, I have found myself in disagreement with so large a number of medical writers, who have left behind them the conservatism of earlier opinions in the English-speaking world, to follow the newer lights of Continental freedom and irresponsibility. The regret is the more poignant, because, speaking from the vantage of seventy years, I believe that the highest realization of human hopes for the welfare of our race, must come through medical science. It is, however, to preventive medicine that the world must learn to look, not to the conquest of disease by new drugs or new serums. There are ailments, which every year in England and America are responsible for thousands of preventable deaths. That fifty years hence, these scourges of humanity will be curable by the administration of any remedy, to be hereafter discovered by experimentation on animals,—

[1] "Biological Experimentation," by Sir Benjamin Ward Richardson, F.R.S. Pp. 73, 109.

in the Rockefeller Institute, for instance,—I have not the slightest faith. It is not through the torment of living creatures, not through the limitless sacrifice of laboratory victims, not through the utilization of babes as " material " for research, that medical science will yet achieve for humanity its greatest boon,—the prevention of disease. I venture with confidence, to make that forecast of the future, leaving recognition of its truth to those who shall come after us, when all now living shall have passed away.

APPENDIXES

APPENDIX I

ILLUSTRATIONS OF PAINFUL EXPERIMENTATION

Not long since, a prominent English physician was asked to indicate certain cases of animal experimentation occurring chiefly within the last quarter of a century, which in his judgment, were unjustifiable and cruel. In reply, he sent the following list of such experiments, each accompanied by reference to the periodical or book where details concerning it may be found. Although he has vouched for the accuracy of these references, yet long experience has shown that slight errors may occur, even when every precaution has been taken for their exclusion; no printer is infallible. Minor errors are the delight of the young critic who can find no other arguments; but it is not believed that any mistakes exist in the references which would hinder the student from finding an account of the experimentation for which he seeks.

Many of the worst instances of cruelty are not included. Sometimes they pertain to another generation; sometimes, in the literature of protest, they have been recorded again and again. Sufficient instances of the infinite variety of modern vivisection are here given to enable anyone to form a judgment regarding them.

Experiments on brain and eyes of cats; observations from 10 to 209 days.—*Journal of Phys.*, vol. xxxiii., p. 156, etc.

Experiments on spinal cord of cats.—*Brit. Med. Jour.*, December 22, 1906, p. 1804.

Experiments on brain and spinal cord of dogs.—Allbutt and others, "System of Medicine," vol. vii., p. 156.

Experiments on brains of curarized dogs to produce epilepsy.—*Lancet*, April 18, 1885, p. 721.

Experiments in producing idiocy in monkeys and dogs.—Dr. Leonard Hill: Allbutt's "System of Medicine," vol. viii., pp. 26-27.

Experiments in causing disease of spinal cord in order to produce lasting paralysis.—*Jour. of Path.*, April, 1908, p. 513.

Experiments on monkeys; exposed spinal cord, touched with hot wire.—*Jour. of Phys.*, vol. xxvii., p. 361.

Experiments on brain of monkeys.—Phil. Trans. Roy. Soc., vol. xxiv., p. 40, etc.

Experiments on brains of dogs and other animals; testing for pain.—Danillo, in Du Bois Reymond's "Archiv," 1884, p. 85.

Experiments on rabbits; puncturing brain and inducing inflammation.—Goodall, *Jour. of Path. and Bac.*, February, 1894, pp. 394-396.

Experiments in causation of epilepsy by blows on head on successive days: observations lasted from six weeks to six months.—Westphal., *Lancet*, No. 2,528, p. 195.

Experiments on circulation of dogs and cats. Struggling.—*Jour. Exp. Med.*, July 8, 1908, p. 498.

Experiments on puppies; removal of glands. Life prolonged for seventy days in some cases.—*Brit. Med. Jour. Sup.*, April 1, 1911, p. 52.

Experiments on eyes of rabbits and guinea-pigs in production of syphilis.—*Brit. Med. Jour. Sup.*, April 17, 1907, p. 28.

Experiments on exposed brains of rabbits.—*Brit. Med. Jour.* (Epit.), August 12, 1904, p. 24.

Experiments on brains of newly born rabbits.—*Brit. Med. Jour.*, February 11, 1905, p. 289.

Experiments on apes; removing portions of brain, etc.—*Brit. Med. Jour.*, August 15, 1903, p. 380.

Experiments in causation of meningitis.—*Jour. Path. and Bact.*, April, 1908, p. 451.

Experiments in causation of malignant tumours in brain of dogs.—*Jour. Path. and Bact.*, January, 1908, p. 389.

Experiments on brain of dogs; compression, abscesses, etc. —*Brit. Med. Jour.*, August 3, 1909.

Experiments on rabbits. Experimenter says: "The first sign . . . is a loud, piercing cry from the animal."— Brucke's "Lectures on Physiology," vol. ii., p. 76.

Experiments on spinal cord of cat.—*Brit. Med. Jour. Sup.*, October 24, 1891, p. 134.

Experiments on spinal cord of horses, etc., causing "most violent suffering."— Brown-Séquard's *Jour. Phys.*, vol. iv., No. 13.

Experiments on spinal cord and brain.—*Lancet*, April 16, 1892, p. 886.

Experiments in causation of peritonitis in animals.— Dudgeon and Sargent, "The Bacteriology of Peritonitis."

Experiments; gastric ulceration in rabbits and guinea-pigs. —*Brit. Med. Jour.*, February 29, 1908, p. 503.

Experiments upon dogs under curare; introducing of rubber balloon in gall-bladder, etc.—*Jour. Phys.*, vol. xxxiii., p. 139.

Experiments upon guinea-pigs and rabbits; tying ureters, cutting out kidneys, etc.—*Jour. Path. and Bact.*, April, 1905, pp. 267-272.

Experiments upon sixteen dogs; introducing gall-stones into gall-bladder.—*Brit. Med. Jour.*, August 5, 1905, pp. 270, 271.

Experiments in producing ulcers of stomach in guinea-pigs by chemical and thermal irritants.—Sternberg, *Medical Press*, October 7, 1908.

Experiments with poisons.—*Jour. Path and Bact.*, July, 1904.

Experiments on kidneys of forty-nine dogs; lived from six to thirty-six days.—*Jour. Phys.*, vol. xii., No. 3, p. xviii; vol. xxiii., p. 415, etc.

Experiments on cats; cutting away kidneys.—*Jour. Phys.*, vol. xxxv., p. 21.

Experiments on animals under *curare* and chloroform.— *Jour. Phys.*, vol. viii., p. 117, etc.

Experiments on ureters of dogs.—*Lancet*, December 11, 1897, p. 1533.

Experiments by injecting virus of tetanus, etc., into spinal cord of animals, "followed by agonizing pain."—Bosanquet on "Serum Vaccines and Toxins," p. 104.

Experiments by injecting foreign matter into blood, in certain cases "promptly followed by marked signs of distress,"—*Jour. Phys.*, vol. vii., p. 283.

Experiments by injecting irritants into eyes of rabbits, cats, dogs and monkeys.—*Jour. Path. and Bact.*, March, 1904; *Jour. Phys.*, August 22, 1904.

Experiments by inoculating the ears of rabbits, the eyes of rabbits, guinea-pigs, sheep and dogs. Involving severe pain.—McFarland's "Textbook upon Pathogenic Bacteria," pp. 219, 266, 272, 355, 385, 396, 398, 477, 527.

Experiments on rabbits and guinea-pigs with germs of catarrh.—*Lancet*, November 28 and December 5, 1908, pp. 1589-1591, 1659.

Experiments on guinea-pigs, causing nerve degeneration.—*Brit. Med. Jour.*, October 10, 1908, p. 1108.

Experiments in producing peritonitis in thirty guinea-pigs.—Dudgeon's "Bacteriology of Peritonitis."

Experiments in causing tuberculosis of kidneys in animals.—*Medical Press*, September 2, 1908, p. 259.

Experiments by inoculation of dogs with tuberculosis.—*Jour. Exp. Med.*, May 1, 1908.

Experiments by inoculation of ears, eyes, etc., of rabbits with pus.—*Practitioner*, vol. xxx., p. 249, etc.

Experiments by inoculating the eyes of rabbits and guinea-pigs with tuberculous matter; contusing knee-joints of rabbits and goats, etc.—*Brit. Med. Jour.*, April 11, 1891, p. 791.

Experiments upon rabbits—inoculating with anthrax.—*Brit. Med. Jour.*, November 21, 1891, p. 641.

Experiments in grafting diseased matter into eyes of dogs and rabbits.—*Brit. Med. Jour.* (Epit.), August 17, 1907, p. 28.

Experiments with glanders.—*Jour. Exp. Med.*, vol. ix., p. 394.

Experiments in injecting mildew into eyes of rabbits and guinea-pigs, causing violent inflammation and suppuration.—*Lancet,* June 13, 1891, p. 1328.

Experiments in causation of violent convulsions in dogs, cats and other animals.—*Jour. Phys.*, vol. ix., pp. 70, 71.

Experiments upon dogs, cats, etc., by poisoning with vanadium.—*Jour. Phys.*, vol. i., p. 260.

Experiments with carbon monoxide of nickel, some prolonged.—*Brit. Med. Jou.*, June 6, 1891, p. 1215.

Experiments with snake-poison on monkeys.—*Lancet,* October 22, 1904, p. 1146.

Experiments with curare.—*Jour. Phys.*, vol. xxxvii., pp. 213-215; vol. xli., pp. 419, etc.

Experiments on cats with poisonous ptomaines.—Proc. Roy. Soc. Med., vol. ii., November 3, 1908.

Experiments on animals with saliva of rabid dogs.—*Brit. Med. Jour.*, October 15, 1910.

Experiments in depriving dogs of water for several days, and then inoculating with anthrax.—*Brit. Med. Jour. Sup.*, November 21, 1891.

Experiments in starvation.—*Jour. Phys.*, vol. xix., p. 167.

Experiments on sciatic nerve, producing in rabbits cries of intense pain.—*Englemann's Archiv für Anat. und Phys.*, 1901, p. 218.

Experiments, cruel and prolonged, on nerves of horses and asses, causing "excessive pain."—*Veterinary Record,* March 8, 1902, p. 553.

Experiments on rabbits, causing severe spasm and screaming.—*Jour. Path. and Bact.*, July, 1910.

Experiments in torture by fright and fear.—*Brit. Med. Jour.*, October 1, 1910, p. 946.

Experiments in torture by extreme cold.—*Jour. Phys.*, vol. xxxii., pp. 308, 309.

Experiments in baking animals, forty to seventy minutes.—*Brit. Med. Jour.* (Epit.), August 17, 1907, p. 28.

Experiments in exhaustion by fatigue and pain.—*Medical Press,* June 3, 1908.

APPENDIX II

In the acquirement of knowledge concerning vivisection, and for the prevention of abuses, it is essential that in every institution where experiments are performed a register of all animals received be carefully and accurately kept. Each one should have a serial number, under which all particulars should be entered. The book used for this purpose should have printed in the first column of each double page the required details concerning which a record is to be kept; the blanks should be written in ink by someone responsible for its accuracy. Some such form as the following outline might perhaps be used for such register:

REGISTER OF ALL MAMMALIAN ANIMALS RECEIVED FOR EXPERIMENTATION IN THE CARNEGIE LABORATORY DURING THE YEAR 1920.

Serial number	*801*	*802*	*803*
Date	Feb. 1, 1920	Feb. 1, 1920	Feb. 2, 1920
Species	Dog	Dog	—
Variety	Mongrel	Spaniel	—
Apparent age	Two years	Very old	—
Sex	Male	Female	—
Colour	Yellow	White	—
Condition	Good	Poor	—
From whom received ..	Bradson	Burns	—
Address	45, Canal St.	22, Mill St.	—
Amount paid him	75 cents	50 cents	—
How acquired by him ..	Found	Found	—
Kept by us for redemption	15 days	15 days	—
Delivered to	Dr. Sharp	Dr. Ball	—
Redeemed or died	—	—	—

From such a register as the foregoing, it would not be difficult to compile a report at the end of each quarter-year, somewhat after the following form:

REPORT OF ANIMALS (MAMMALS) RECEIVED FOR EXPERIMENTATION AT THE CARNEGIE INSTITUTE, DURING QUARTER ENDING MARCH 31, 1920.

	Dogs.	Cats.	Monkeys.	Other Mammals.	Total.
On hand, January 1 ..	20	4	2	14	40
Acquired	91	142	11	132	376
Total	111	146	13	146	416
Redeemed by owners	11	0	0	0	11
Died before use ..	2	0	1	0	3
Used for experiment	84	76	10	98	268
On hand at date ..	14	70	2	48	134
Total	111	146	13	146	416

(Signed) A. B.,
Registrar of Laboratory.

STATE OF NEW YORK.
CITY OF NEW YORK. ss.

On this 31st day of March, 1920, before me, the subscriber, personally came A. B., known to me, and he, being duly sworn, declared that the foregoing report signed by him is a full, true, and complete statement of all the animals of the species named therein, which were either on hand on the first day of the quarter, or which have been received at the Laboratory of the Carnegie Institute for experimental purposes, and the disposition thereof, for the quarter-year ending March 31, 1920.

.....
Notary Public.

It is necessary not only to know what animals are received at any laboratory; we must be able to follow them to the end. Each individual instructor, professor or assistant-professor, or other person who performs experiments of any kind should be required to state what he has done. The following is an outline of a report which might be made to the Director in charge of the laboratory.

A REPORT OF ALL MAMMALIAN ANIMALS USED FOR EXPERIMENTATION, EITHER BY MYSELF OR UNDER MY PERSONAL SUPERVISION IN ..... LABORATORY, DURING QUARTER ENDING MARCH 31, 1920.

	Dogs.	Cats.	Monkeys.	Guinea-Pigs.	Other Animals.	Total.
I. Number of animals used solely for original research ..						
II. Number of animals used for demonstration before students, of physiological facts						
III. Number of animals experimented upon by students						
Total						
IV. Number of above animals, in experimentation upon which *curare* was used ..						

(Signed) .....
Assistant in Physiology.

STATE OF NEW YORK.
CITY OF NEW YORK. SS.

On this 31st day of March, 1920, before me, the subscriber, personally came A. B., known to me, and he, being duly sworn, declared that the foregoing report was signed by him, and that it is a true, full and complete statement of all mammalian animals used by him or under his personal supervision for experimental purposes in the ..... Laboratory during the quarter ending March 31, 1920.

.....
Notary Public.

Suggested form of report, to be made quarterly by the responsible head of each Institution wherein animal experimentation is authorized.

A REPORT OF THE DISPOSITION OF ANIMALS (MAMMALS) USED FOR EXPERIMENTAL PURPOSES IN ALL LABORATORIES OF CARNEGIE INSTITUTE DURING QUARTER ENDING MARCH 31, 1920.

Animals.	Dogs.	Cats.	Monkeys.	Other Animals.	Total.
I. Number used for original research only, by:					
Dr. X.					
Dr. Y.					
II. Number used for demonstrations before students, by:					
Dr. A.					
Dr. B.					
III. Number used by students for observation of physiological phenomena, etc. ..					
Total					
Number of above animals to which curare was given, in course of experimentation					

(Signed) .....
Director of Laboratory.

STATE OF NEW YORK.
CITY OF NEW YORK. ss.

On this 1st day of April, 1920, before me, the subscriber, personally came C. D., known to me, who, being duly sworn, declared that the foregoing report signed by him, is a full, true and complete statement of the disposition of all animals experimented upon in the laboratories of the Carnegie Institute, during the quarter-year ending March 31, 1920, to the best of his knowledge and belief.

.....
Notary Public.

APPENDIX III

It is exceedingly probable that no young physician or medical student could testify to cruelties witnessed in any physiological laboratory, if they involved his instructors or fellow-students, without injuring and perhaps ruining altogether his professional career. Only in later years, when success and independence have been attained, can he venture to speak freely of what he has seen. Some men have thus spoken. The testimony of two is here given :

Rev. Frederic Rowland Marvin, M.D., Albany, N.Y.:

" Though now a Minister of the Gospel, I was educated to the profession of medicine, and was graduated from the College of Physicians and Surgeons (Medical Department of *Columbia College*) New York, in 1870. In the class-room *I saw vivisections so unqualifiedly cruel that even now they remain in my memory as a nightmare.*"

(*From letter to The American Humane Association.*)

" All medical students in America know that similar outrages are perpetrated in our medical colleges every winter. I have witnessed vivisections *so cruel and unnecessary that I am ashamed to remember that they were under the patronage of my Alma Mater.*"

(*From sermon preached at Portland, Oregon.*)

Dr. Henry M. Field, Professor Emeritus of Therapeutics, Dartmouth Medical School, Dartmouth College, writes:

" I well remember my experience as a student of medicine at the College of Physicians and Surgeons, New York. . . . I well remember the poor dogs, brought out from their dungeon, perhaps famished and tortured with thirst, should the experiment require such condition; their appealing eyes and trembling limbs, I shall never forget. . . . Indeed, *some form of torture and atrocity was expected at every lecture, and sure to be applauded.* . . . The student who found entertainment in the unnecessary torture of animals, learned something besides physiology; his humane nature was perverted. . . ."

(*From letter to the Vivisection Reform Society, dated April* 28, 1905.)

APPENDIX IV

A LETTER OF DR. JOHN BASCOM,

LATE PRESIDENT OF THE UNIVERSITY OF WISCONSIN.

To the Editor of the "Springfield Republican."

SIR,—In the complexity of our many social problems, it does not quite do to extemporize an opinion. In a recent issue the *Republican* came very near falling into this fault. Taking as its text a striking example of locating a clot of blood on the brain, and referring the knowledge by which this was done to vivisection, it spoke lightly of the limitations which many have sought to put upon this practice. It is not the assertion of the opponents of vivisection, that it is always useless, but that it has been carried much beyond the demands of any desirable and humane purpose. Even the example given is not so striking if we remember that it has long been known that each half of the body is governed not by the adjacent, but by the opposite, lobe of the brain.

Considering the uncertainty, and the costly nature, of the knowledge gained by vivisection, and the great abuse the practice has suffered, its opponents demand that animals should not be subjected to this suffering except in view of some definite and important question to be answered; that the pain involved in such an investigation should be reduced to its lowest possible terms; that experiments once satisfactorily made should not be indefinitely repeated; and that vivisection should not be left in the hands of every tyro acquiring the rudiments of knowledge. These claims are almost as much a demand of accuracy in knowledge as of humanity in temper. The pain involved in vivisection often creates such an abnormal state as to weaken or invalidate the conclusions drawn in connection with it. The careless student may easily confirm, as he thinks by observation, opinions not well grounded.

Vivisection has been objected to not theoretically or sentimentally simply, but on account of the monstrous abuses that have been associated with it. In Europe men of distinguished ability have seemed to revel in this form of inquiry and to have prosecuted it without the slightest reference to the cruel and revolting features associated with it. They have made of it a school of Nero in which brutality became a passion of the mind.

One of the most deadly sins of men has been cruelty, cruelty to animals, to children, to women, to men. The basest of these forms is in some respects cruelty to animals, since animals are so thoroughly committed into our hands. It is not easy to devise a more hardening process than careless vivisection; and the claim that it is done in the name of knowledge is, unless it is profoundly and deeply true, an aggravation of the offence. Inhumanity is the worst possible temper for the medical profession to entertain, and the worst possible suspicion to attach to them. If the physicians cannot approach all suffering with an intense desire to relieve it, he is not true to his calling. It is with more or less fear that the defenceless human subject is committed to them lest they should make of him an experiment.

JOHN BASCOM.

WILLIAMSTOWN,
December 15, 1902.

APPENDIX V

Among American physicians, probably the most distinguished medical writer of to-day is Dr. George M. Gould, author of several medical works, and formerly editor of various medical journals. His opposition to antivivisection ideals has always been pronounced; but it has not prevented recognition of the abuses of the unlimited practice of animal experimentation. Some extracts from an address delivered by Dr. Gould before the American Academy of Medicine are here presented. The reader should understand that they are extracts only, and that they represent but one aspect of the speaker's views. Perhaps they are the more valuable in that they are the utterances of the most pronounced American critic of antivivisection of the present time.

The Limitations and Errors of the Vivisectionists.

The first that strikes one is an exaggeration of the importance and extent of the vivisection method. As valuable an aid as it is, it is not the only, and perhaps it is not the chief, method of ascertaining medical truth. It has without doubt often been used when other methods would have been productive of more certain results. This has arisen from what a large and broad culture of the human mind perceives to flow from a recent and rather silly hypertrophy of the scientific method, and a limitation of that method to altogether too material or physical aspects of the problem. . . .

Almost every point over which the controversy has raged most fiercely has been in relation to one or all of the three or four questions:

1. What is a vivisection experiment ?
2. By whom should it be performed ?

3. For what purpose should it be performed ?

4. By what methods should it be carried out ?

In reference to all of these questions, scientific men should unite and establish a common set of principles or answers. In my judgment their failure to do so at all, and besides this, their frequent exaggeration of logical limits and just claims, has been one of the unfortunate causes of useless and wasteful wrangling. . . .

(2) I believe scientific men have made a grave mistake in opposing the limitations of vivisection (not mortisection) experimentation to those fitted by education and position to properly choose and properly execute such experimentations. No harm can come, and I believe much good would come, from our perfect readiness to accede to, nay, to advocate, the antivivisection desire to limit all experimentations to chartered institutions or to such private investigators as might be selected by a properly chosen authority. . . . At present the greatest harm is done true science by men who conduct experiments without preliminary knowledge to choose, without judgment to carry out, without true scientific training or method, and only in the interest of vanity. It takes a deal of true science and patience to neutralize with good and to wash out of the memory the sickening, goading sense of shame that follows the knowledge that in the name of science a man could, from a height of 25 feet, drops 125 dogs upon the nates (the spine forming a perpendicular line to this point) and for from forty-one to one hundred days observe the results until slow death ended the animals' misery. While we have such things to answer for, our withers are surely not unwrung, and in the interests of science, if not from other motives, we have a right to decide who shall be privileged to do them.

I have adduced this single American experiment, but purposely refrain from even mentioning the horrors of European laboratories. This is not because I would avoid putting blame where it belongs, but because such things are peculiarly prone to arouse violent language and passion, clouding the intellect and making almost impossible a de-

sirable judicial attitude of mind. The Teutonic race is to be congratulated that it is guilty of at least but few examples of the atrocities that have stained the history of Latin vivisection, and before which, as before the records of Roman conquest and slavery, or of the "Holy Inquisition," one shudders at the possibilities of mental action in beings that bore the human form and feature. . . .

To jeer at and deride "sentimentality" while pretending to be working for the good of humanity is hypocritic and flagrant self-contradiction. This attitude of mind on the part of a few men does more to arouse the indignation of opponents than any cruelty itself. Scientific men should root out of their ranks such poor representatives. They are enemies in the scientific household. Dr. Klein, a physiologist, before the Royal Commission, testified that he had no regard at all for the sufferings of the animals he used, and never used anæsthetics, except for didactic purposes, unless necessary for his own convenience, and that he had no time for thinking what the animal would feel or suffer. It may be denied, but I am certain a few American experimenters feel the same way, and act in accordance with their feelings. But they are not by any means the majority, and they must not only be silenced, but their useless and unscientific work should be stopped. They are a disgrace both to science and humanity. . . .

And this brings me to what I can but conceive as a grave and profound mistake on the part of the experimentalists—their secrecy. A truly scientific man is necessarily a humane man, and there will be nothing to conceal from the public gaze of anything that goes on in his laboratory.

It is a mistake to think our work cannot bear the criticism of such enlightened public sentiment as exists here and now; if there is necessary secrecy, there is wrong. People generally are not such poor judges as all that. . . . I would go even further. Every laboratory should publish an annual statement setting forth plainly the number and kind of experiments, the objects aimed at, and most definitely the methods of conducting them. At present the

public somewhat ludicrously but sincerely enough grossly exaggerates the amount and the character of this work, and by our foolish secrecy we feed the flame of their passionate error. An organized, systematic, and absolute frankness, besides self-benefit, would at once, as it were, take the wind out of our opponents' sails. Do not let us have "reform forced upon us from without" in this contention, but by going more than half-way to meet them, by the sincerest publicity, show that as well as scientists and lovers of men we are also lovers of animals. Faith, hope, and love—these three. To faith in knowledge, to hope of lessening human evil, we add love—love of men, and of the beautiful living mechanisms of animal bodies placed in our care.

As it appears to me, this most unfortunate controversy, filled with bitterness, misrepresentation, and exaggeration, is utterly unnecessary. Both of the sharp-divided, hate-filled parties are at heart, if they but knew it, agreed upon essentials and furiously warring over non-essentials and errors. I frankly confess that one side is about as much at fault as the other, and that the whole wretched business is a sad commentary upon the poverty of common charity and good sense. . . .

APPENDIX VI

THE REGULATION OF EXPERIMENTATION ON HUMAN BEINGS

A Bill for the regulation of the practice of experimentation upon human beings in the District of Columbia and elsewhere has been drawn, and will shortly be introduced in the Senate of the United States. An outline of the proposed Bill is here given, but in some respects it may be enlarged or modified before its final introduction. It is believed that a law may be framed which shall prohibit only those acts which are contrary to justice, and which should be forbidden by common consent.

A Bill for the Regulation of Scientific Experimentation upon Human Beings in the District of Columbia and in the Territories and Dependencies of the United States.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled:

Section 1. That hereafter no person shall make upon any human being any scientific, medical or surgical experiment or operation, *except for the benefit of the person experimented upon*, unless the intelligent, personal consent of such latter person shall previously have been obtained. Every such consent, to be valid, must be in writing and must be preceded by a full and correct written statement setting forth to the person whose consent is sought whatever painful, injurious or dangerous consequences are obviously liable to result from the proposed experimentation, and such statement shall be signed both by the experimenter and the person to be experimented upon.

Section 2. That experiments or operations of this

nature shall be undertaken only by one of the responsible head-physicians or surgeons of some hospital or public institution or by his special written authorization; provided only that nothing herein contained shall apply to scientific investigations incapable of causing injury, made by direction of authorities in charge of any institution of learning, upon students, with their consent, for the purpose of testing acuteness of mental action, or for the purpose of investigating other mental or physical phenomena.

SECTION 3. That no scientific, medical or surgical experiment of any kind, liable to cause pain or distress or injury to health or danger to life, shall be permissible under any circumstances upon any new-born babe, or upon any infirm or aged or feeble-minded person, or upon anyone whose mental faculties are impaired, either temporarily or permanently, or upon any woman during pregnancy or within a year after her confinement, or upon any child under fifteen years of age, unless it be undertaken for the sole benefit of the person to be experimented upon; and the consent of any such person to any such experiment or operation shall not constitute such legal consent as is required by this act, but shall be null and void.

SECTION 4. That the responsible head of any hospital or public institution, in which any experiment or operation of any of the kinds mentioned in Section 1 of this Act shall have been made, shall on or before the first day of February in each year make a written report, attested by oath, to the Commissioners of the District of Columbia of all such experiments and operations that shall have been made in such hospital or public institution during the calendar year next preceding, which report shall contain copies of the statements and of the consents required by said Section 1, together with detailed accounts of such experiments and operations and the results thereof; and such reports shall be printed annually.

SECTION 5. That any person who authorizes, performs or assists in performing an experiment or operation in violation of any provision of this Act shall be liable, upon con-

viction, to a fine not exceeding one thousand dollars ($1,000) and shall thereafter be incapable of legally engaging in the practice of medicine in the District of Columbia or in any territory under the jurisdiction of the United States, and of holding any official position of any kind under the Government of the United States.

SECTION 6. That all sections of this Act shall be applicable to the District of Columbia and to all other territory under the jurisdiction or military control of the United States.

APPENDIX VII

SCIENTIFIC OPINIONS

A FEW years ago, Sir Benjamin Ward Richardson, M.D., a Fellow of the Royal Society and a distinguished sanitarian, was asked to express his opinion regarding experiments upon animals. He was a member of the medical profession; for some years he had been a lecturer on physiology in a medical school; he had been a practical experimenter, and his discoveries of new agents and methods for the production of anæsthesia had given him a high place in the scientific world. His reply to a series of questions was embodied in a volume entitled: "Biological Experimentation; its Function and its Limits." Certain extracts from this work,—in some cases slightly abbreviated,—are here given. They are of special value, as the views of an eminent physician, a scientific discoverer, and a practical physiologist.

If in creation there was no pain, if no pain could be extorted except by a physiologist, a physiologist inflicting pain, even for the cure of disease would be an accepted criminal by the general voice of mankind. But Nature is a laboratory of pain on the most gigantic scale; she stands at nothing in the way of infliction, spares nothing that is sentient. She inflicts pain for her own purposes, and she keeps it going. . . . If man inflicted such painful diseases as Nature inflicts, he would be a monster. Man rebels against these inflictions. Shall he add to pain by his rebellion?

In Science, there is no one method that can be considered indispensable. Attributes are indispensable; observation, industry, accuracy are indispensable; methods are not. Methods may be convenient, they may be useful, they may be expedient, but nothing more. Celsus tells us that Erasistratus and the school he founded laid open the bodies of criminals in order to study by direct observation, the action of the intestinal organs during existence. The act at that date of civilization probably shocked no one; it was no doubt in accord with the spirit of the time. In a day not very remote from our own, a criminal sentenced to death for some trivial crime, was given over to William Cheselden, surgeon to George the First, for experiment. The criminal was deaf and the experiment intended was that of making a puncture through the drum of the ear, in order to discover if an opening through the drum would enable the deaf to hear. At the last moment, Cheselden, a man of fine feeling, and brilliant as an operating surgeon, declined the experiment, on which the criminal, whose life had been conditionally spared, was set free. For his generosity of mind, for shrinking from an experiment on another human being, Cheselden lost caste at Court, and was considered pitiable by those who lived on courtly favours.

The argument is taking now the same direction against experiments by man conducted on the lower animals for the purposes of discovery; and when from the history of the past we gather what has been achieved by such experiments, there is but one answer—namely: that such experiments, although they may achieve what was expected from them, were not indispensable. They may have expedited discovery; they may have led to discovery; but they were not indispensable.

In the discovery of anæsthesia, general and local, painful experiment on animals has played no indispensable part whatever.

The lower animals have been permitted to share, more than equally with man, in the blessing of anæsthetic dis-

covery, for by it, many of them have been saved the agonies of painful death, but they have (not) been subjected to painful experiment in the course of discovery. . . . The instauration of general anæsthesia came from experiments made on man alone. There is no suspicion of any experiment on a lower animal in connection with it. . . . On the contrary, there is a most notable fact in relation to experiments under chloroform made on lower animals, which suggests that if they had ever been relied on,—chloroform would never have been introduced into practice. Flourens, the eminent French physiologist, tried the effect of chloroform on inferior animals, and in consequence of its powerful and fatal influence on them, put it aside as an anæsthetic.

There are methods of producing local insensibility to pain which have been tried, and which deserve notice.

In 1862, I made an attempt to carry out local anæsthesia by exhaustion of blood from a part. I noticed that when three round cupping-glasses were applied to the body very close to each other, the clear triangular space left free within the rim of the mouths of the glasses was rendered white, brawny-like and insensible, when the suction of the glasses was complete. This was obviously due to the local abstraction of blood from the part; and I thought, consequently, that if I could exhaust the blood from the extremity of a limb, the exhausted part might be operated upon without pain. . . . I tried the process on myself, and finding it succeed, the operation of removing the nail of the great toe, was tried on a patient, quite painlessly, the patient looking on and feeling nothing. But the proceeding was too long and cumbersome to admit of introduction into practice generally, though it indicated an important principle which may in some future day be utilized. In this research, no experiment on a lower animal was resorted to; I was myself the victim in all preliminary experiments.

The most numerous and extensive efforts for local anæsthesia have been those in which extreme cold has been employed to produce the benumbing effect. The earliest applications of cold originated between two and three hundred years ago in the fencing schools of Naples. A Neapolitan professor of training placed crushed ice in a flask of thin glass, and then applied the chilled glass to the skin, and held it there until the skin was frozen, in order that the cautery could be employed, or other small operations performed without the infliction of pain. The proceeding must have been most successful, and why it became lost is one of the mysteries of scientific research. It did remain lost until our own time. . . . I invented for the same purpose the ether spray process, in which a benumbing cold was produced by projecting a volatile liquid like ether or amylene, or a stream of compressed gas . . . on the part to be anæsthetized. These methods have been so widely adopted that I need not enter into any description of them. I have merely to say that they were made without any aid of experiments of a painful kind on the lower animals. . . . The earliest experiment with ether spray was made on my own arm.

It is fortunate for me that I have been an eye-witness of the progress made in this department from its practical instauration. I recall the days when operations were performed without the aid either of general or local methods for abolishing pain. I have myself introduced new methods of anæsthesia, generally and locally; I have brought to trial a large number of new anæsthetics. By the invention of the lethal chamber I have had the delightful privilege of removing the taste and pain of death from probably a million of those friends of man, the faithful dogs. I write this not boastfully but truthfully. . . . Painful experiments have played no indispensable part in the discovery of anæsthesia.

It is a curious fact that every method of research which is most enduring, most intellectual and most free from moral evil is farthest away from any and every thing that shocks the conscience or raises a doubt as to necessity, in sensitive minds. If mathematics had to be cultivated through experiments on living animals, it would never have succeeded in unfolding the magnificent mysteries of the universe. The same applies to the work of the sciences of chemistry, of botany, of physics generally. In my opinion, every man who studies natural things by experiments on living subjects of any species, feels the truth of what I am saying. I know in my own case, that my mind during such experiments has always been in a different state according to the line of experiment. When the experiment has been conducted on dead or inanimate matter, the return obtained from the labour demanded has always been not only satisfactory, but pleasant to the mind. On the contrary, when the experiment has been conducted on living or animate matter, the labour, whether affirmative or negative in its results has never, at any point of it been pleasant. The results may, and often have excited curiosity; they may have been important, and they may have opened the way to new inquiry, but they have never been free of anxiety nor of a sense that whatever came from them, *there was something that was not right.* I do not believe I am more sentimental than any of my colleagues; yet I never proceeded to any experiment on a living animal, though to the best of my ability doing everything possible to save all pain, without feeling—what I think is the proper expression,—*compunction.*

In the hands of the teacher, it (vivisection) may be rankly abused; of scientific pursuits, it is the one most liable to error; it suggests no end to itself, but seems to grow by what it feeds on, becoming by repetition and contest more and more extended and multiplied; it is of all pursuits the most disliked by the educated community; it brings its best and most self-sacrificing professors into scorn; and for

all such reasons, even if it be occasionally useful, is calculated to lead to what would be designated intellectual and moral evil. At the same time, let it be understood that I do not include in the criticisms experiments which are devoid of pain, nor experiments which being devoid of pain, may cause the death even for the service of man. Above all, I could not for a moment object to experiment by a truly competent man for the purpose of inquiry into some great theory that has been leisurely formed, and can be proved or disproved by no other means, as for example, whether an important surgical operation can or cannot be performed for the saving of human suffering or human life.

There are some simple and painless experiments which may be demonstrated to any set of pupils, although living animals are the subjects of them. The demonstration of the circulation through the web of a frog; the demonstration of the different natural temperatures of the bodies of animals, including man; the influence of various anæsthetic vapours; the collection of the breath of various animals for the purpose of analysis,—these are all free from objection. . . . In a word, all experiments which are painless and harmless, are, as I assume the most humane would admit, free from any charge of error. But when we come to consider the application of experiment of a severe kind as a means of education of pupils who are making a study of physiological problems, there is reason for hesitation. In my student days, such an experiment was never dreamed of. The professor of physiology would relate the facts derived from experiment, on which some important theories were founded; he would, for instance, explain what experiments were made by Harvey in order to describe the circulation of the blood, but he would not attempt to repeat those experiments in the lecture-room. He would describe, in his remarks on the functions of the nervous system, the researches of Sir Charles Bell, . . . but he would never think of repeating Bell's experiment of division of the nerves

in the column, alleging forcibly Bell's own objection to its repetition. It was the same on every point. He would relate the theory; relate the *pros* and *cons ;* relate possibly his own independent inquiries, or what he had seen experimentally performed by other independent investigators; but with that explanation, he would be content.

When I was teaching physiology as I did teach it in a medical school for many years, I abstained for a long period from the direct experimental method. I found no difficulty, and my classes worked satisfactorily. The students had the credit of becoming good physiologists, and I am sure there was nothing shirked. In the latter part of my time, I followed occasionally the plan of making a few experiments in the way of demonstration; and although these were rendered painless, the innovation was not the success that was expected. . . . Intellectually, I do not think my classes were assisted, in the main, by the experimental demonstration. I am sure it limited my sphere of usefulness, by leading me, in the limited space of time at my command, to omit some parts of physiology of a simpler, less controversial, and more useful kind. I am bound to say that, morally, I do not recall the effect as producing all that could be wished. . . . I gave up experiments in my classes, not from any sentiment, but *because I got on better without them.* I did not omit the facts derived from experiment, I did not omit the report of my own experimental endeavours; but I omitted repeating, for the mere sake of demonstrating, what seemed to have been proved. . . . Were I again to deliver a course of physiological lectures to qualified hearers, I should make the experimental demonstrations on living animals as few and far between as was compatible with duty. They would be exceptional of exceptional, and painless from beginning to end.

I recommend, as the best method of obtaining the great aims of medicine,—sanitation and the prevention of disease,—first, to make medicine the grand master and teacher of universal cleanliness, and to make everyone of the community a disciple and follower of the same law. The minister of medical art should be prepared to devote his life to this simple duty. He needs no higher calling, no nobler vocation, and a world that knew its own interests should sustain him in the task. At present, the rage is for experimentation, although it seems least wanted, for which rage *the selfish and ignorant world is most to be blamed.* The world now, as in the days of Naaman the leper, wants to be healed and protected by elaborate processes, when the simplest and surest remedy is in its own hands.

From a long experience as a teacher of physiology and of public health, I am convinced that a school or university of preventive medicine would fill an important want. It would tend to make every man and woman a sanitarian, and would help to bring the principles of health into every home. It would be of direct and practical utility; it would instil an exalted comprehension of natural laws, of the advantages of following those laws, and of the danger and folly of setting them at ignorant defiance. . . . The end would be the accomplishment of the great aim, the development of the health of the people; the art of preventive medicine without inflicting pain on any living thing.

APPENDIX VIII

SINCE the preceding pages were in type, the United States Department of Agriculture has adopted new regulations governing the inspection of meat. The rules ordered to be put in force November 1, 1914, so far as they appear to be applicable to meat derived from animals affected by cancer or malignant disease, are as follows (*italics not in original*):

REGULATION II. DISPOSAL OF DISEASED CARCASSES, ETC.

Section 7.—*Any individual organ or part of a carcass affected with carcinoma or sarcoma* shall be condemned. In case the carcinoma or sarcoma involves any internal organ *to a marked extent*, or affects the muscles, skeleton, or body lymph glands even primarily, the carcass shall be condemned. In case of metastasis to any other organ or part of a carcass, or if metastasis has not occurred, but there are present secondary changes in the muscles . . . the carcass shall be condemned.

Section 9.—All slight, well-limited abrasions on the tongue and inner surface of the lips and mouth, when without lymph-gland involvement, *shall be carefully excised*, leaving only sound, normal tissue *which may be passed.*

Any organ or part of a carcass which . . . is affected by a *tumour*, an abscess, or a suppurating sore shall be condemned; and when the lesions are of such character or extent as to affect the whole carcass, the whole carcass shall be condemned.

It will be seen that the criticism suggested (pp. 269-270) concerning the regulations in force for many years past is not annulled or obviated by the new rules. That which formerly was vague is now more clearly and distinctly set forth. The new regulation most carefully condemns for food purposes "*any individual organ or part*" of a carcass affected with carcinoma or sarcoma (cancer), and such con-

demnation applies to the carcass, if the malignant disease has involved other parts "to a marked extent." The fact that an animal is suffering from cancer does not of itself compel its rejection for human food. The entire rule would seem to have been drawn so as to permit meat affected by cancer to pass inspection as "sound, healthful, wholesome and fit for human food," provided the inspector in charge can declare that in his judgment the malignant disease had not affected the meat "to a marked extent."

In view of the mystery that still surrounds the causation of cancer, this regulation of the Department of Agriculture should be entirely changed. Its basis is regard for financial considerations rather than the public welfare. No part or portion of any animal found to be affected by malignant disease should ever be permitted to be sold for human food. The regulation should read:

> *Section 7.—Any animal or carcass of any animal found upon inspection to be affected, however slightly, with malignant disease (carcinoma or sarcoma) shall be wholly condemned as unfit for human food.*

APPENDIX IX

ENGLAND AND WALES: DEATHS OF FEMALES FROM CANCER AT DIFFERENT AGE-PERIODS, AND THE RATIO TO POPULATION, DURING TWELVE YEARS OF THIS CENTURY.

Year.	Under 35.	35–44.	45–64.	65 and over.	Total.	Rate per Million Population.
1901	695	1,811	8,263	5,827	16,596	985
1902	701	1,872	8,229	5,972	16,774	986
1903	702	1,896	8,490	6,202	17,290	1,006
1904	703	1,934	8,511	6,448	17,596	1,010
1905	719	1,904	8,683	6,445	17,751	1,011
1906	740	1,921	8,945	6,805	18,411	1,038
1907	731	1,956	8,841	7,018	18,546	1,035
1908	658	1,943	9,026	7,189	18,816	1,036
1909	701	1,952	9,466	7,671	19,790	1,082
1910	780	2,030	9,376	7,578	19,764	1,070
1911	730	2,080	9,485	8,018	20,313	1,088
1912	695	2,009	9,926	8,505	21,135	1,117

The foregoing table strikingly illustrates the increasing prevalence of cancer in England during the present century. Among women it will be seen that the rate of mortality has increased from 985 to 1,117 per million living within almost a single decade. The slow and yet regular recurrence year after year of a slightly increased mortality from cancer at each period of life after the thirty-fifth year is peculiarly ominous. The connection between the increase of cancer and the permitted utilization for food purposes of animals suffering from cancerous ailments is a problem that awaits solution.

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