

RECENT DEVELOPMENTS IN SURGERY

DON W. DEAL, Springfield, Ill.

One cannot enter upon the discussion of the recent developments of surgery without coming at once upon the part which animal experimentation has played in the reduction of human mortality.

There has been a great deal said and written on this subject—much which is sane and sound and much which is hysterical and sentimental. Medical men and scientific workers are not in any sense unmindful of the sufferings of lower animals and, in animal experimentation, pain is reduced to the minimum or eliminated altogether. In fact, it has seemed to me that scientific investigators hold these animals in higher regard—that they are appreciative of what these animals contribute to science—that they are kinder and gentler in handling them than would be many of the heart-throbbing sentimentalists.

These sentimentalists do not speak of “animal experimentation.” They prefer to talk of “vivisection” which has a distressingly quivery sound like the tremulo of the fiddle in the

murder scene of a melodrama. They like to picture the eminent scientist as a hairy armed and bewhiskered individual in a blood-stained white gown, gouging at a bound-down pup with a hot poker for no higher reason than that of gratifying his curiosity as to how burning human flesh may smell.

Without detracting in the least from the glories of modern war, it seems to me that, if a dog were consulted he would gladly risk his life for the purpose of saving the lives of countless human beings. I believe this because his more intelligent human brother gladly surrenders his life, in aeroplane and submarine, for no more laudable purpose than that of depriving of life his fellows against whom he has no personal grievance.

Without experimental work with animals no scientific advance would have been possible, unless human subjects were substituted for guinea pigs in experimental work. Bed-side observations alone would not have accomplished appreciable results. They would have left us at the period of crude guess in medicine where "what's good for measles?" was the type of scientific problem which puzzled doctor's heads.

I am going to take this opportunity to criticise the people who derive a lot of self-satisfied altruism by exaggerating the discomforts of animals that are being studied.

A pamphlet recently distributed by anti-vivisectionists, calls the Rockefeller Institute, "Hell at Close Range." The anti-vivisectionists disregard all pain save that which meets with their opprobrium and enables them to indulge in their favorite epithets. They strongly condemn the one justifiable pain in the world—the pain associated with the noblest of all objects—the prevention of future pain and saving of human lives.

If a man has a right to kill animals for any purpose, he has the right to perform vivisection, particularly since it is done without pain. Who is more cruel? Doctor Flexner, in devising life saving methods or the women who would shackle him, shut up the Rockefeller institute and thrust all future developments into oblivion?

These same people insist upon spaying animals by the thousands in order that beef and mutton may be tender or have a more pleasant flavor.

Think of the ospreys and egrets in the hats of these same women.

Think of a ship infected with plague and also infested with rats—the carriers of plague—about to enter port.

Do you prefer to kill the rats and so prevent them and the disease from entering the port, causing the dissemination of plague, or save the rats because the slaughter of them would be a painful procedure.

The captain who says spare the rats, is guilty of the criminal act of causing the death of many innocent human beings. So it is with the anti-vivisectionists. They see only the pain inflicted and do not heed the pain prevented. On this score they are in a sense logical when they call Lord Lister, discoverer of antiseptics, a brute, although he, of all men, has been the means of preventing the greatest amount of surgical suffering. They see only the pain which he deliberately inflicted on a few rats and rabbits, they cannot see or they refuse to see the measureless amount of misery he has prevented.

The slight pain animal experimentation causes in the world is trivial when we consider that in the universe thousands and thousands of pains, of fierce incessant struggles between living animals, are going on constantly. Every rock and every tree shelters ferocious combats and is the constant scene of painful death agonies.

Consider that in the entire world only 200,000 animals are sacrificed annually for experimentation; and that two thousand million mammals die every year from natural causes.

By giving an experimental disease to a rabbit, one scarcely changes its lot. Surely the lot of a street dog is improved when it enters an experimental laboratory.

Many anti-vivisectionists amuse themselves by hunting and fishing, while a physiologist is tremendously concerned every time he causes blood to flow or inoculates an animal with disease. I know the thoughts that animate him. The experimenter feels the responsibility of these animal lives.

These men pass their lives in nauseous rooms, amidst poison and virus, receiving no other compensation for long labors than the satisfaction of duty accomplished. It is not in the laboratories of the physiologist that a man grows rich.

Let us consider whether the efforts of experimenters and the sacrifice of animals has paid.

In 1906, Dr. Flexner at Rockefeller Institute, developed a serum for meningitis and sacrificed 25 monkeys and 100

guinea pigs. This one experiment saves thousands of human lives a year.

Careful scientific experimentation has developed a serum for meningitis which directly destroys the growth of germs. As a result the mortality of the disease has been reduced and severe symptoms and crippling complications have been prevented.

In 1878, Koch discovered the tubercle bacilli. Before that time it was thought that tuberculosis was due to a divine anger. Since then tubercular mortality has been reduced 50 per cent. Since Koch, six million people have been saved by progress in hygiene. It has been clearly shown by experimentation that tuberculosis is not inherited.

Animal experimentation has made a rich contribution to children. I fear laymen are insufficiently informed on these important subjects. Hysterical imaginings would discredit this beneficial work. The ones to suffer most from a suppression of animal experimentation are helpless suffering children.

As an illustration, let us consider the ravages of diphtheria in New York City, prior to the use of antitoxin. In 1894 there was a mortality of more than eleven thousand children, while ten years later, after antitoxin had been well introduced, the mortality was but slightly over two thousand. A saving of mortality in one city in one year from one disease was practically nine thousand. It is estimated that since Behring discovered diphtheria antitoxin, one million, three hundred and fifty thousand children in France alone, have been saved by its use. Behring sacrificed one hundred rabbits and twenty-five dogs to make this discovery. In 1895 the mortality rate from diphtheria in nineteen American cities was eighty per one hundred thousand. Ten years later it was seventeen per one hundred thousand. If this rate could be applied throughout the United States, it would mean today an annual saving of sixty thousand children as the result of antitoxin treatment and public health laws.

I wish that the people trying to throttle scientific research, would witness the awful struggle of a child dying from diphtheria croup. Surely they could then realize the importance of these discoveries. Fortunately few physicians are forced to go through such an ordeal at present owing to the beneficial results of treatment resulting directly from animal research.

Hydrophobia has been almost stamped out; and so has benefited dogs as well as human beings.

Smallpox has been practically eliminated in civilized countries by vaccination. During the eighteenth century, sixty million people died of this disease in Europe and multitudes were permanently scarred. The reign of this destruction and death continued until Jenner's discovery in 1796. In Germany, where compulsory vaccination has been enforced, there has not been an epidemic for many years. Adjacent countries not so protected have had numbers of epidemics.

Typhoid fever in armies has killed and maimed more than bullets. In the Spanish-American War, one-fifth of the soldiers in national encampments had typhoid fever. Among one hundred thousand men there were twenty thousand cases and sixteen hundred deaths.

In 90 per cent of volunteer regiments the disease broke out within eight weeks after going to camp.

Contrast this to the recent mobilization in Texas, where but two cases of typhoid developed and both recovered. In 1898 at the Jacksonville camp, with practically the same number of troops, there were two thousand cases and two hundred and forty-eight deaths.

In operative surgery wonderful strides have been made.

Anti-vivisectionists would be content to use the same old horribly dirty methods of surgeons employed in the days before Lister, and thereby offer up thousands of human lives to their Moloch. Lister's discovery of antiseptics has reduced the mortality in simple amputation from 70 per cent to practically nothing. Lord Lister in 1868 sacrificed a few guinea pigs and rats, and we have the above results.

The most useful advances in surgery are not necessarily those which are the most spectacular, nor are these advances based upon accidental or sudden discovery. A great many people have the idea that animal experimentation or other scientific research, consists in striking about hit or miss in the hope that some valuable fact may accidentally show itself. Nothing could be further from the truth. The scientific student starts out with a carefully elaborated theory or belief, to which he has given the utmost thought and his experimental work is conducted along a well prepared plan for the purpose of proving or disproving his preconceived theory.

One of the most interesting developments in surgery of the present generation is that which has as its purpose, the re-

duction or elimination of so-called "shock," with the purpose of returning the patient to his active vocation in the shortest possible time and of causing the individual the smallest amount of injury through the operation itself.

With all of the benefits which come from properly conducted surgical operations, intelligent surgeons have always recognized that the ordinary administration of ether or chloroform and the ordinary surgical procedure, are accompanied by a certain amount of psychic and physical violence which make their impress upon the mind and body of the patient with certain definite prejudicial results.

This injury is caused in several ways. First, there is the element of fear. Second, the powerful impression carried to the brain through the violence done to the tissues involved in the operation. Third, the depression caused by the deep intoxication of prolonged anæsthesia.

To overcome this element of shock there has been devised a method known as the Nitrous Oxide Oxygen Anosi Association. The process is relatively new, but I am satisfied, from a personal experience of several months, that it is a method which will eventually be adopted by the conservative surgeons of the world.

Briefly, this Anosi theory, as taught by Crile, of Cleveland, assumes that potential energy is stored in the brain, the liver and in suprarenals, and that when this energy is destroyed in sufficient amount, there results a condition known as exhaustion or shock. This discharge of potential energy may be brought about by any insult to the body such as trauma, hemorrhage, starvation, worry, excitement or insomnia, and is produced to an enormous extent in ordinary surgical operations and this discharge is occasioned in surgical operation, although the patient may be thoroughly anaesthetized and unconscious of actual pain. The unconsciousness does not prevent the transference of sensation from the field of operation to the brain, although the patient may be oblivious to the pain which would thereby be occasioned were he awake.

The Anosi Method of handling the patient for surgical operation consists of the following logical steps:

1. The element of fear is eliminated as far as possible, the attitude of the surgeon and his assistants is essentially optimistic and encouraging. The patient is given a preliminary injection of morphine and scopolamine to quiet his anticipation and to reduce the amount of anæsthetic required.

2. On account of its peculiar action upon the brain cells, ether is in itself a shock producing factor, and so in this process we have adopted nitrous oxide, which prevents oxygen reaching the brain. Crile has demonstrated that an operation under ether produces three times the amount of shock that the same operation does when performed under nitrous oxide, and he also shows that the blood pressure under ether falls two and one-half times greater than under nitrous oxide anæsthesia.

3. The psychic effect of taking ether is much greater on account of the rather disagreeable odor, and the sense of choking and suffocating occasioned by it, while nitrous oxide is entirely odorless and only a few inhalations will produce unconsciousness.

4. Ether is known to destroy the white cells of the blood, which, as you know, are the natural protectors of the body from bacterial infection. Hence, to a certain extent, ether promotes infection by breaking down the natural resistance to infection.

5. Many surgical operations are known as two step operations, in that they have to be performed at two sittings. Ether anæsthesia is so disagreeable that the patient usually approaches the second operation with the utmost apprehension, while the Anosi Method is so far from being disagreeable that the patient has no fear of the second anæsthesia.

6. To overcome the depressing effect of ether, major operations under local anæsthesia or under spinal anæsthesia were suggested, but it was found that even if these operations were entirely free from pain, the consciousness of the patient that violence was being done to the body, was sufficient to produce considerable shock.

7. Having produced unconsciousness by the method most agreeable to the patient, the Anosi Method includes blocking off the field of operation with a local anæsthetic so that the impulses of the operation are prevented from reaching the brain. In this combination we avoid the psychic stimulation of the brain cells by unconsciousness, and also protect the brain from the shock due to disturbance in the operative field. The method also involves the handling of the operative field with the utmost care on the part of the surgeon.

With an operation conducted with prevention of shock or violence, post-operative nervous exhaustion is almost eliminated and, by blocking off the incision with a solution of

quinine and urea hydrochloride, post-operative pain becomes a negligible factor.

Under this method I have had the gratifying experience of having a patient operated upon for appendicitis, removed from the operating table to a wheel chair and permitted to dress and walk about the hospital within six hours after the operation.

When through ether it was found possible to make surgical operations painless and when through asepsis it was found that infection could be avoided, we had a comfortable feeling that we had solved the great problems of surgical procedure and that there were few, if any, great cardinal principles yet to be discovered.

This recent discovery of the element of shock in surgical operations leads us to believe that there is still much to be discovered and that perhaps there yet remains unknown some great factor in surgical development quite as important as anæsthesia or asepsis. Certainly the prevention of shock may be placed on a par with these two great epoch making discoveries.