Original Communications.

THE USE OF STIMULANTS IN PNEUMONIA.

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(Read to a Private Society in Birmingham.)

IN introducing to the notice of the Society the subject which I have chosen for our discussion this evening, my design is to endeavour to demonstrate the great value of stimulants in the treatment of pneumonia, and to advocate their fearless administration, in doses proportioned to the apparent necessities of the particular case; extending my advocacy to the freest employment of brandy, even in hourly doses, whenever the bodily powers are suffering under a state of great and unusual depression.

But, in pursuing this design, I would strictly confine the cases to which I apply this treatment to one particular class: to that, namely, of low or asthenic pneumonia. I would strongly oppose the indiscriminate use of stimulants in *all forms* of the disease, as a matter of routine. I think that the stimulant treatment will suffer in public estimation, if adopted beyond the limits which I have ventured to prescribe, and will often be unjustly exposed to the discredit of producing effects not properly belonging to it. On the contrary, I would maintain that our practice in this respect must be regulated by the circumstances presented to us, and that we shall often meet with cases of pneumonia in which there is no indication for stimulating, in which, therefore, the use of stimulants would be positively injurious; and I would urge that careful discrimination must be exercised before we arrive at a decision, whether to employ a stimulating or a depressing plan of treatment; or whether even to leave the patient to the unaided power of nature.

I must, therefore, beg to say that I do not at all depend on stimulants as a cure for inflammation. On the contrary, I dislike to hear of the "stimulant treatment" of any disease—if that term be understood to mean that stimulants are to be regarded as the recognised and established remedy for *all cases* of such disease. I regard stimulants as being calculated simply to meet a special emergency which may arise in any case, and to be inapplicable unless such emergency present itself; and I believe that the strength and quantity of the stimulants employed must be adapted to the particular emergency. Even in typhoid or typhus fever, diseases which most frequently demand the energetic employment of the remedies in question, there are some cases which never require a stimulant from first to last, and others in which a very moderate quantity fully answers the requirements of the case.

Nor can I regard a case of inflammation as being one which must necessarily run its course—which, therefore, we have only to watch, confining our efforts to attending to the patient's strength, and fortifying it for the inevitable struggle. I cannot think that we should venture to treat a case of *true* croup on this principle; on the contrary, I should rest my hope of saving my patient by "cutting short" the attack in its early stages. And so in pneumonia, as it appears to me, it will be our duty to arrest the disease as soon as possible by tartar emetic; even by a bleeding, if the case admit of such a measure; and the only legitimate ground of debate, in reference to the question of depressing or of stimulating, consists in the opinion we entertain as to the amount of constitutional power residing in our patient; this inquiry, if I mistake not, will have to be made in

every case, and, possibly, in every case a somewhat different reply will be given.

Pneumonia appears to have been chosen by common consent as the ground on which pathologists may fight the battle of inflammation; on which they may contest their opinions as to its nature, and especially as to its treatment. Hence, it seems to be generally understood that our verdict respecting the disputed point of stimulating in this disease, will rule our conduct in relation to the other individuals of the same class of disease.

It is, I believe, to Dr. Todd that we are indebted for the general attention which this subject has received at the hands of the medical public; for, although it is certain that stimulants were prescribed in pneumonia by individual practitioners quite as largely as by that eminent physician, yet, until he announced his views upon the subject, the question does not appear to have received so large a share of attention as it does at the present time. I must beg to say, that I have only a very general acquaintance with the opinions entertained by my late respected teacher, and that such acquaintance has been gained only at second hand; I must not, therefore, be supposed to refer to his views beyond their most general application, either in the way of assent or of denial. I wish to place the subject, so far as I am able, on a footing of ordinary pathological reasoning, and not under the authority of any pathologist, however eminent he may be.

Now I think there can be no doubt that disease, at the present day, does not endure depleting, or even depressing treatment, to the same extent as in former days. Whatever theory we may hold on the subject, the fact is undeniable, that venesection is seldom practised now, at least in large towns. I well remember that, when I was a dresser at the General Hospital, two or three and twenty years ago, it was very common for persons to apply to the surgery to be bled for some supposed ailment; and that "VS." was regarded as being an item in the day's "casualties," as much a matter of course as was "DE." At present such an application is quite unknown. Although such applications were indeed extra-professional, they nevertheless afforded a fair indication of the direction taken by medical practice. Again, with regard to tartar emetic; the larger number of cases in which mercury is preferred in the treatment of pneumonia, even by those who do not stimulate largely, seems to me a further argument in favour of the opinion that the present type of pneumonia is of a lower character.

I think I may go further, and say that, in this town at least, we seldom hear of the employment of tartar emetic in the large doses originally prescribed by Rasori, and administered, as a habit, when I was a student; or that, if prescribed at the commencement of the case, they are speedily and necessarily reduced.

Nothing is more striking in reading the works of the highest authorities, written some thirty years ago, than to observe the freedom with which the lancet was employed; so it was by Abercrombie, in all forms of diseases of the brain; so it was by Andral, in the same class of maladies; and although, in reading Andral's fifth volume, we recognise in some of his cases the mischievous consequences of large depletion (in the gradually increasing dulness or delirium, ending finally in coma and death, without the discovery of any *post mortem* appearances to explain the symptoms observed), we cannot avoid the conviction that some good reason must have existed for the institution of a practice so generally adopted, albeit carried sometimes to a disastrous excess. Indeed, to come nearer to our present subject, many of Andral's cases of pneumonia manifested the most marked improvement, for a time, after a free bleeding from the arm; and not once only, but more than once, on the repetition of the bleeding when the inflammation sprang up again.

I think that we cannot contrast the practice to which I have now referred, with that adopted around us, at the present day, without arriving at the conclusion, whatever we may say of stimulants, that depletion, or even depression, is not endured as it used to be twenty or thirty years ago.

If, then, such be the present type of disease, it seems a very probable supposition that we shall meet with cases of pneumonia, in which support and active stimulation will be imperatively required. Whether such a supposition be correct, must be determined by experience; and the use or avoidance of stimulants, in the treatment, will follow the result of such experience. The result of my own limited observation has led me to the conclusion that cases of pneumonia frequently present themselves, in which support by stimulants is greatly needed; and that there are not a few, in which the largest administration of stimulants affords the only chance of saving the life of our patient.

Now I am unable to see that this opinion involves the application of the plan of treatment I have just advocated to all cases of the disease, without distinction; or that it forbids the use of the opposite class of medicines, whenever circumstances permit. It must be allowed that pneumonia presents itself under very different and even opposite aspects, according to circumstances, sometimes easily appreciated, sometimes concealed from our observation. The cases which I shall briefly relate, will, I think, place this point in a clear light. If Cases I and VII be compared, a very remarkable difference will be noticed between them; in both, the disease occurred in young, healthy, and vigorous subjects; both the patients stated themselves to have been temperate in their habits; in both, the attack probably resulted from simple exposure to cold: yet, in one case, the patient was so exhausted as to require full doses of stimulants; whilst, in the other, half-grain doses of tartar emetic were taken without any depressing effects; and, to make the parallel complete, under these opposite methods of treatment, each patient recovered in nearly the same period of time, so far as the *primary* effects of the disease were concerned. Pneumonia, indeed, is not at present regarded as being necessarily attended with all the peril which was, at one time, imagined to attach to it. On the contrary, our hopes and fears are based much less upon the intensity, or even the extent of the inflammation, than upon collateral circumstances—its cause, the presence or absence of blood-poisoning, the presence of cachexia, the soundness or unsoundness of the patient's previous health and his habits of life; and, more than all, upon the amount of reaction of which the constitution seems to be capable at the particular time. Thus, there are cases of the disease which we do not hesitate to leave to the unaided powers of nature—to that tendency to recovery which pneumonia undoubtedly possesses if a fair chance be given; thus there are cases, even of double pneumonia, which we regard without serious apprehension (I have seen more than one such case myself); whilst, on the contrary, there are others in which only a very limited portion of one lung is involved, and yet we entertain the gravest fears for our patient's life. It seems, therefore, that there is abundant reason, founded on the nature of the disease itself, for a variety in the treatment adopted in different cases.

Now, among the varieties of pneumonia, there is an important class having a most unmistakably typhoid type; the so-called low, or asthenic pneumonia. We meet with this class in the course of certain blood-diseases, particularly in typhus, erysipelas, and acute rheumatism; it occurs also in surgical and puerperal fever; in persons whose health has been broken by disease, by intemperance, by prolonged mental anxiety or overwork; in those in a state of cachexia; and in certain subjects of organic disease of the spinal cord. Sometimes, also, instances of this character are met with in subjects ap-

parently in good health, from the operation of some cause not apparent to us, as in Case VII.

Even under favourable circumstances, pneumonia exercises a powerful influence over the nutritive functions, of which the rapid emaciation which often occurs affords an exemplification; hence, when it attacks a system ill prepared to withstand its depressing influence, symptoms of exhaustion manifest themselves early, and often to a very serious extent. Under such circumstances, the pulse is often rapid, is accelerated by the smallest movement or the least excitement, and is always very yielding, frequently vibrating and unsteady; the sounds of the heart are feeble; the lips are dusky, from languid circulation through the lungs, and the face is rendered livid by any exertion; profuse sweatings occur; the patient is unable to sit up, except for the most cursory examination; delirium of a low type is frequently, though not invariably, present at intervals; and the sufferer expresses himself as feeling very ill, and his whole aspect betokens the serious character of his disease. In such cases as these, I apprehend that we have chiefly to fear depression of the powers of circulation, especially of the energy of the heart; and it is upon the circulating function that stimulants exert a very direct influence; hence, it is to maintain the force of the circulation, especially against the obstacle opposed to the right ventricle by the engorged lungs, that I advocate the administration of stimulants, and mainly of brandy, graduated according to the urgency of the case, but fearlessly increased if necessity arise.

Now I venture to ask whether there is any real reason why stimulants should not stand, in relation to pneumonia, and I may say, in relation to inflammation generally, in the position they hold with respect to typhus?

I well remember that, when I was studying my profession, the use of stimulants in typhus itself was treated as a matter requiring great circumspection, and not to be admitted without much consideration; now, however, we proceed more boldly, and have no hesitation in employing these remedies freely, even in very large doses. It seems to me that the indications in pneumonia are identical; nor can I discover any thing in the presence of an inflammation to alter the conditions of the case; certainly the presence of pneumonia in typhus is not considered to require the suspension of our stimulants. We are now no longer influenced by a mere name; we now recognise, in inflammation, a process tending directly to degrade the nutrition of the part which it affects; involving an arrest of the current of blood in the inflamed capillaries, softening of tissue, and causing effusion of fluids which damage the structure of the organ in which they are poured. Nor do we hesitate to apply local stimulants to the inflamed part, and to quicken the process of inflammation itself, when it is flagging, by strong tonics and moderate stimulants; nor again are we sparing of our wine in weakly debilitated habits. If this be so, why, I ask, should we draw an arbitrary line, beyond which our stimulant treatment shall not pass, whatever be the exhaustion from which our patient is suffering?

In looking at the cases in which free stimulation has been adopted, with the limitation I have prescribed, I am unable to detect the faintest evidence that the treatment has done harm; on the contrary, in many cases, immediate reduction takes place in the frequency of the pulse, with increase in its force, and restoration of its steadiness, under the influence of frequent and full doses of brandy; the heart's sounds gain strength; marked evidence of amendment is visible in the aspect of the patient; discomfort is relieved, energy is increased, the lividity leaves the lips, and not unfrequently the improved state of things is spontaneously testified by the patient, in reply to our first inquiry. This was most remarkably the case in my seventh case.

And there are two circumstances in relation to this negative view of the subject, which I think, have a very positive value. First, the large doses of brandy administered never, so far as my experience goes, produce any excitement or any narcotism. I cannot but lay very great stress on this fact, for brandy is by no means negative in its operation. That a delicate woman should swallow two tablespoonfuls of brandy every two hours, for forty-eight hours, without an approach to anything like intoxication, is surely a very significant circumstance. I cannot but conclude that the force of the brandy is expended in some other operation than that of producing intoxicating effects upon the brain. It will be further noticed, in some of the following cases, that a reduction in the quantity of brandy, during the progress of the disease, was actually followed by relapse; and that it was necessary to restore the medicine to its former dose. The second remark I would make is that, in some of the cases, the symptoms of local disease disappeared very rapidly; quite as rapidly as in an ordinary sthenic pneumonia, in a vigorous subject; a circumstance which at least proves that no harm had resulted from the active and powerful agent employed; which I should regard as affording powerful evidence in my favour, when I remember that in the low state of constitution to which I applied the remedy, local mischief usually occupies a longer period in resolution, than in the opposite state, unless some assistance has been afforded.

It has been asserted by M. Claude Bernard, on the authority of an American physician, in answer, I suppose, to such an argument as I have now adduced, that the alcohol is not absorbed, in consequence of the abnormal condition to which typhus (the disease which suggested the remark) reduces the nutritive functions; and in support of the hypothesis, he quotes an experiment in which prussiate of potash (a salt readily absorbed and voided in the urine) having been administered to a typhoid patient, could not be found, by the usual tests, in that fluid. I have twice repeated the experiment, employing iodide of potassium: once in a patient suffering under typhoid fever, once in a case of asthenic pneumonia, both patients taking at the time full doses of brandy. In each instance I detected the iodine in the urine by the usual test. Of course, this experiment can only be accepted as proving by implication the absorption of the brandy; at any rate, it fully establishes the possibility of such absorption.

The most conclusive proof of my position would be afforded by statistical data; especially by the duration of convalescence under the stimulant treatment; but I think that the particulars required for a sound induction can only safely be afforded by a larger comparison of cases than we at present possess the means of instituting; still I believe that a sufficient number of successful cases have been reported to give the practice I advocate a fair claim to consideration.

In conclusion, I would remark that I by no means regard the practice in question as forbidding the cooperation of blisters, or even of local bleeding. With regard to the latter measure, I have learnt, from two cases of typhoid fever, in which profuse hæmorrhage occurred from the bowels, at the time when the patient was in the lowest state of depression, and yet perfect recovery was effected, that moderate loss of blood, even in very low states of constitution, is not attended with danger, *provided the patient maintains the recumbent posture*; I should, therefore, not hesitate to apply leeches, if I saw occasion for such a procedure. Equally do I think that mercury is not forbidden to those who esteem its efficacy in pneumonia; for my own part, I confess that I mistrust its utility, and fear its ill consequences in the inducing of severe and even dangerous diarrhoea, as actually happened in one case under my observation during the period of recovery.

The following cases are selected with a double purpose: to illustrate the different conditions of physical strength which are exhibited in pneumonia, and also to exemplify the use of stimulants in doses of various quantities:—

CASE I. E. M., a fine, well-made young man, of temperate habits, and excellent general health, was admitted into the Birmingham General Hospital, suffering from pneumonia, apparently in consequence of exposure to cold, on the fifth day of the disease. His pulse was 112, soft; respiration 16, very catching; evidence of pneumonia of the entire lower lobe of the right lung existed. The tongue was rather dry, but his general condition was satisfactory; he was alert, and fully equal to some exertion. He complained of severe pain in his right side, beneath the mamma, extending towards the clavicle. Eight leeches were applied to the painful part. Sumat 3tis horis antimon. potassio-tart. gr. 1-6.

On the following morning, the pulse was 106, fuller; respiration 23, very straining; urine copious; tongue moist; aspect very satisfactory. Sumat antimon. potassio-tart. gr. 1, 4tis horis. In the evening of the same day, the pulse was 102; the respiration 36. The expectoration not copious; pain in the side continued. He took milk very freely. The dose of tartar emetic was increased to half a grain, and a turpentine stupe was applied to the side.

On the next (the third day) his symptoms were generally improved. Pulse 96; respiration irregular, between 20 and 30. The dulness had decidedly diminished, and fine crepitation was again audible over the posterior region of the right chest. In the evening the dose of antimony was reduced to a quarter of a grain, and the medicine was omitted on the fifth day, when his pulse was 80, and his appetite had returned. On that day the natural clearness on percussion was nearly restored; and on the eighth day respiration was purely vesicular.

CASE II. A delicate boy, aged 14, was attacked with sharp fever of an inflammatory character, followed by pain in his right flank, and in the upper part of the right front of his chest. On the evening of the second day, evidence of pneumonic consolidation of the lower half of the inferior lobe of the right lung presented itself, with indications of bronchitis in the opposite lung. The feverish reaction was sharp, but the strength of the pulse, and the general aspect of the patient did not warrant further antiphlogistic treatment than a few doses only of tartar emetic ($\frac{1}{4}$ of a grain in each), and the application of a blister. He simply took salines, and subsequently small doses of carbonate of ammonia. On the fifth day of the pneumonia the physical signs began to yield, and on the following day the dulness was removed, and vesicular expiration and inspiration were restored. He made a good recovery. In this case I had the advantage of the advice of Dr. Evans.

CASE III. A. T., aged 17, a feeble delicate girl, who, on a former occasion, had suffered from acute rheumatism, with endocarditis, and double pneumonia, was admitted into the Birmingham General Hospital, with a renewed attack of acute rheumatism. Her pulse continued about 120; over the heart a diastolic aortic bellows-sound was audible.

On the seventh day after her admission, her pulse was 112; her respiration had risen from 28 to 38; and imperfect dulness with bronchial breathing announced themselves at the base of the left lung, together with rhonchus throughout the whole of both lungs. She had cough, and copious expectoration of opaque mucus; she perspired profusely.

The treatment previously adopted had been two grains of disulphate of quina and a quarter of a grain of opium every four hours. I made no change in the treatment, beyond the repeated application of turpentine to the left side, and the addition of four ounces of wine in twenty-four hours. The consolidation rapidly became

complete, and it was seventeen days before it was removed; but the patient's state continued satisfactory, and her recovery was as nearly perfect as her cachectic condition permitted us to expect.

I must confess that, in comparing this and the following case with some which succeed, I am led to suspect that a more free use of stimulants would have hastened the removal of the consolidation.

CASE IV. A cooper, aged 24, was admitted into the Birmingham General Hospital with acute rheumatism. He was in a state of considerable depression; pulse 136; respiration 34. He had a recent pericardial friction-sound, with increase in the extent of the cardiac dullness, and pneumonic consolidation of the lower lobe of *each* lung; the dullness on the left side extending to the inferior angle of the scapula; on the right not attaining that elevation by the distance of two inches. Some effusion had also taken place in the right pleural cavity. I ordered a blister over the cardiac region; calomel and opium; and four ounces of wine daily. Notwithstanding the amount of acute disease, the patient's symptoms never presented a grave character, though emaciation progressed very rapidly. From February 18th to March 8th, his pulse varied between 136 and 120; respiration between 40 and 30. He took nourishment. His urine was copious; and, though he felt some oppression, his breathing was free from labour. He never came under the influence of mercury; and on the fifth day, one-half of a grain of opium every three hours was substituted for that medicine. The wine was gradually raised to ten ounces on the fifth day; blistering was repeated more than once. On the fifteenth day, the pericardial friction-sound was no longer heard; but vesicular breathing was not fully restored to the lungs until the thirty-second day.

CASE V. A girl in a state of extreme anæmia, aged 23, was admitted into the Birmingham General Hospital. She was extremely depressed, with low feverish reaction; and was quite unable to endure the semi-erect posture. Respiration was 36. She had a frequent spasmodic cough, with expectoration of viscid mucus; a harsh systolic bellows-sound was heard over the aortic valves. She was ordered two ounces of wine.

I must confess to having made an insufficient examination of this patient until the sixth day, when I discovered imperfect dullness in the posterior region of the chest, on the right side, up to the fifth dorsal spine, with bronchial breathing and bronchophony. A blister was prescribed; and on the following day, as her pulse was very vibrating and yielding, in number 104, whilst extreme feebleness remained; and as, moreover, her lips were dusky, four ounces of brandy in twenty-four hours were ordered, together with chloric ether and carbonate of ammonia. On the following day, the patient's pulse was 112, vibrating; respiration 40. Six ounces of brandy were prescribed; and, on the day after, her pulse had sunk to 104, and her respiration to 30. On the following day, her pulse was again at 112; respiration 36; but her aspect had greatly improved, the expectoration had lessened, the dullness was much reduced, and the other physical signs had much improved.

The amendment was still more evident on the succeeding day, and was strongly asserted by the patient herself. The physical signs of pneumonia were also receding. Two days afterwards, being the eighth day from the discovery of pneumonia, all physical signs of that disease were removed. It is to be added that, before she left the hospital, the bellows-sound was hardly audible—a circumstance which renders it probable that it was of an anæmic character, although its roughness during the early days rendered such a supposition at first improbable.

CASE VI. I might here introduce a case of low pneumonia, which I attended with Dr. Keyworth, in a gentleman of rather feeble habit, who had suffered much from

anxiety, in which the inflammation was at first central. In this case, the patient's quantum of wine was raised to two ounces hourly; partly, indeed, without our privy. The case was a lingering one, from the extreme feebleness of the subject, but he entirely recovered; and I now refer to it to obtain Dr. Keyworth's confirmation of the benefit derived from stimulation.

CASE VII. A nightman, aged 24, of sound health and temperate habits, admitted into the Birmingham General Hospital with pneumonia of the upper lobe of the right lung, of three days duration. He was greatly depressed, and was so faint at his admission, and his face was so livid, probably from the effort of the journey, that the nurse, a very experienced one, thought him dying. After recovering from the effect of his journey, his pulse was 108, small; respiration 44. He was ordered eight leeches to the chest; four ounces of wine; and ammonia.

Next day, the pulse was 116, very feeble; respiration 40; face dusky and livid on the smallest exertion; sounds of the heart very feeble. The lower and middle lobes of the lung were now implicated, so that we had to deal with inflammation of an entire lung. Turpentine stupe, ammonia and chloric ether, and one ounce of brandy every two hours, were ordered.

Next day, the pulse and respiration had fallen to 108 and 36 respectively; the heart's sounds were clearer; the lividity was gone; his tongue was rather dry; there was no confusion; urine was plentiful; he perspired profusely; he took nourishment freely. On the following day, he spoke of himself as feeling better, and had passed a good night. The stupe was repeated; the brandy was reduced to half an ounce. But in the evening he was more feeble, and the pain in the upper part of the side had much increased. A blister was applied to the painful part, and half an ounce of brandy given hourly.

On the next morning he expressed himself strongly as feeling better, and had passed a good night, requiring to be awakened for the administration of the brandy. The pulse and respiration had fallen from 108 and 42, the standard of the preceding evening, to 98 and 31 respectively; the expectoration also contained less blood. Brandy was ordered every two hours.

The amendment was fully maintained in the evening, when the brandy was reduced to a dose every three hours; and, on the following morning, his pulse and respiration were 88 and 30 respectively. Moreover, the dullness was beginning to yield, and crepitation to reappear. Vesicular breathing was fully restored on the thirteenth day after admission; it was rapidly reinstating itself five days previously. The emaciation which pneumonia tends to produce was most strongly developed in this man.

CASE VIII. I visited Mrs. C., aged 27, with Mr. Swain. She had been much lowered by previous illness, and had miscarried twice within the year. She had been confined three weeks.

She was suffering very acute pain in her left side; pulse 158; face pale; slight blueness of lips; respiration abdominal. There was no difficulty in establishing the presence of pneumonia at the base of the left lung. She was ordered six leeches to the side, salines, and ten grains of Dover's powder.

On the next morning, we found the pain greatly relieved. Pulse 154, very yielding; respiration 32; lips rather livid. The pneumonic consolidation had risen higher in the lung, as far as the apex of the scapula. Ammonia and chloric ether, beef-tea and milk, were ordered. In the evening, pulse and respiration as before, but the pulse was more tremulous. The heart's sounds were tolerably distinct. Much perspiration. Intellect clear. A blister was ordered to be applied for four hours; and half an ounce of brandy to be given every two hours.

She passed a more comfortable night; her pulse had

sank next morning from 154 to 128, and was firmer; respiration had risen from 32 to 42.

On the following morning, we found that our patient had passed a bad night, and had had much delirium. She felt very ill. The pulse was 112, steady, though very feeble; respiration 40. A catheter was required. One ounce of brandy was ordered to be given every two hours. She expressed herself as feeling better in the evening; her voice was firmer and louder; there was no delirium.

On the day following, her state was satisfactory; she continued to take an ounce of brandy every two hours. But next day she was not so well; she had wandered more, though her appetite had returned. The amount of brandy had been somewhat lessened; the original quantity was therefore restored, and quinine was prescribed.

The brandy was continued for one or two days. On the eighth day of my attendance, the dulness had gone, and vesicular breathing was restored; but her pulse and respiration continued 130 and 40 respectively. She speedily recovered sufficiently to be removed to her mother's.

I must add that, in this case, I thought the patient's condition nearly desperate; I had little hope of a favourable termination of the case. Nor can I entertain a doubt, that the successful issue could have been procured by no other means than by the free administration of brandy which was employed. As I do not vaunt the use of stimulants as a certain cure for pneumonia, I think it unnecessary to occupy further time by detailing cases in which these remedies failed to save the patient. I only wish freely to admit that such cases have occurred to me, but that they presented not the smallest reason to warrant the supposition that the stimulants were concerned in producing the fatal event.

I wish to state, in conclusion, that I desire to extend the remarks I have now applied to pneumonia, so as to embrace the whole subject of inflammation; admitting the same limitations, and advocating a similar plan of administering stimulants, when occasion appears to call for their use.

OBSERVATIONS ON THE PHYSIOLOGICAL ACTION OF ACONITINA.*

By DYCE DUCKWORTH, Esq., Student in Medicine in the University of Edinburgh.

THE special physiological actions of aconitina have received able attention and observation at the hands of Drs. Fleming and Headland. Upon reading over carefully the different kinds of action said to be exerted by this body, I was particularly struck with a singular incongruity in the accounts as to the condition of the pupil, both during the time when the poison was acting, and also after death had resulted. This fact, amongst others, led me to make a series of experiments with the alkaloid, which extended over a period of five months, and were performed whenever leisure and circumstances permitted. The first object was to obtain pure aconitina; for I imagined that possibly the incongruous statements regarding its action might in some measure, at least, be due to the employment of impure samples of the alkaloid. From its costliness, it is apt to be adulterated, or met with in an impure condition. I therefore obtained three samples—one prepared by Messrs. Smith of Edinburgh; another by Mr. Morson of London; and a third foreign one, which was not quite pure. I could rely upon the purity of the first two samples, by applying the only test known for the alkaloid, viz., confidence in the

characters of the chemists who prepared and sold it; and I found them equally efficacious and infinitely superior to the foreign specimen.

I experimented upon rabbits, cats, and kittens, internally; and topically upon the conjunctivæ of two human adults.

Action of Aconitina given internally. When aconitina in solution is given by the mouth, the first effect produced is a most intense tingling sensation in the tongue and fauces; this is followed instantly by a copious secretion of saliva, over which the patient appears to lose control, since it is not swallowed, but flows over the lips in a frothy and slimy condition. This is seen to the greatest excess in the case of the cat; not nearly so much is secreted in the rabbit. Dr. Headland thinks this condition is due in some measure to paralysis of the fauces. In the human subject, the patient is observed to clutch at the throat after aconite-poisoning; and all animals exhibit uneasiness in that region, as if to assist or accomplish deglutition, which function seems to be lost in all cases, while pharyngeal and œsophageal actions appear rather to be reversed. The respiratory functions are next apparently interfered with; the breathing becomes laboured and spasmodic; and cries are uttered with more or less vigour, according to the amount of the dose. Next vomiting occurs, and may continue several times; this is attributed, with good reason, by Headland, to derangement of the function of the vagus, since *post mortem* examination reveals no appreciable change in the coats of the stomach. Sensation next appears entirely lost; and the animal, as if mad, tosses itself about wildly; endeavours to walk, but cannot; falls over on its side; takes prodigious leaps; and is then prostrated. Convulsions generally appear at this time, and the breathing becomes slower and more difficult. Finally, total paralysis is observable, and death ensues.

Condition of the Pupil. During the action of the poison, the pupils are slightly contracted; but I have noticed in all cases that, about two or three minutes before death, and at the time of death, they dilate enormously, and generally continue so after death, though I observed in some cases that, in an hour or two after death, one pupil contracted, while the other remained unchanged; and I have even seen the contraction vary in the same pupil several times within twelve hours after death. The action on the pupil differs, however, according to the manner in which the poison is introduced into the system. I find the prevailing opinion to be, that aconite causes contraction; Headland gives it as his opinion, that dilatation is produced. It is a very difficult matter to say what the real effect is. Dr. Fleming states, in his admirable dissertation on *Aconite* (p. 11), that "in general the pupil is more or less contracted, dilating to its natural size immediately on the cessation of respiration". This statement is the most correct one I have met with, though I differ from it in that I hold the pupils to dilate considerably beyond their normal size at the time of death; in fact, this was a most constant and striking symptom in every case in which I employed sufficient to cause death. Hence I would say, as a rule, the pupil is more or less contracted, dilating enormously a few moments before and at the time of death.

As to the cause of this, Fleming states that the symptoms seem to him attributable to the same pathological cause as the convulsions. He attributed the convulsions to cerebral congestion, since they only occurred when the poison acted slowly, and the respirations were diminished; so that, from advancing asphyxia, the venous system must have been highly congested. "Contraction was present in all the cases in which convulsions occurred." I can verify this latter statement. He found that, when muriate of aconitina was injected into the veins, the pupils dilated before any amount of venous congestion could have taken place (and I have

* Excerpt from a Dissertation upon the Physiological and Therapeutical Actions of the Alkaloids. Read before the Royal Medical Society of Edinburgh, December 14th, 1860.