tensive subject. I feel, however, conscious of having made good the position set out with, as to the undoubted benefit to be derived from this extensive class of remedies. In the cursory allusion made to each spa, however, minute accuracy was not attempted; but it is hoped that, in giving the leading constituents, the appropriate spring may be readily fixed upon. Much must depend upon a just review of the specialities of every particular case. Collateral subjects, as to their mode of administration, etc., will very materially affect the result, and determine whether this class of medicinal agents is to maintain the claims set up as to their influence in removing functional disorder or incipient disorganisation and decay.

22 Somerset Street, Portman Square, June 1854.

ON GALLIC ACID;

ITS REMEDIAL POWER IN THE HÆMORRHAGIC DIATHESIS, AND IN DISEASES CHARACTERISED BY RELAXED FIBRE OR EXCESSIVE SECRETION.

By WILLIAM BAYES, M.D., Physician to the Brighton Dispensary.

[Read before the Medico-Chirurgical Society of Brighton and Sussex, Nov. 3rd, 1853.]

THE few remarks which I bring under your consideration this evening relate to a therapeutic agent, whose value has hitherto, as I believe, been insufficiently appreciated by the profession at large.

In those works upon materia medica to which I have had access, gallic acid is chiefly lauded for its admirable power in arresting hæmorrhages; but even in these fluxes the mineral astringents are, as yet, held in more general estimation by the main body of the profession—a preference which I do not think would be maintained were their relative merits better understood.

Long prevailing practice indeed favours the exhibition of the mineral astringents in the treatment of hæmorrhage, but safety and convenience in administration, as well as greater certainty in effect, will certainly be found in gallic acid. In it we have not only a powerful but a perfectly safe astringent, an advantage of no mean value over lead and other minerals, since, from the poisonous nature of these, their employment must be restricted: gallic acid, on the other hand, may be given in continually repeated and increasing doses, only limited in their quantity and frequency by the removal of the necessity which called for their exhibition.

The truth of this proposition was well demonstrated in the case of hæmoptysis, reported by me in the *Provincial Medical and Surgical Journal* of Sept. 20th, 1852. In this case, I gave a drachm of the acid in less than two hours (in five-grain doses), and during the succeeding twenty-four hours another drachm was taken, with no distress or evil consequences of any kind, either then or subsequently, to the general health. It is no mean advantage to possess an astringent which exercises its own proper power, and at the same time is neither excitant nor irritant, neither sedative nor depressing.

Another advantage to be found in gallic acid is the ease and rapidity with which it enters the blood and saturates the system, whence it is not only to be preferred before minerals, but also before tannic acid.* In the case before alluded to, the bloody sputa became perfectly inky in one hour and forty minutes. That the system was then completely saturated with the remedy was proved by these sputa being perfectly black throughout, not merely tinged or coated with black, as would have been the case had the contact with the remedy taken place only in the mouth and fauces. Simultaneously with this inky appearance, the hæmoptysis ceased. The effect produced upon the

pulse was, that it became hard and wiry, and steady in its beat.

The effects of tannic and gallic acid on dead animal tissues are familiar to us in the process of tanning. It contracts and hardens the dead animal tissue. Experiments have also shown that a saturated solution of gallic acid, mixed with fresh drawn blood, both quickens coagulation and hardens the clot. Solutions of vegetable astringents thrown into the veins of animals have produced death through coagulation in the central organs of circulation; and since the astringent power of all vegetables depends upon the amount of tannic and gallic acid contained in them, and since we have seen that gallic acid readily enters the blood, I think we may fairly assume that, when introduced into the human system, gallic acid acts through its tendency to contract and condense the fibrous tissues, and to coagulate the vital fluids, wherever they have this natural disposition.

Affecting, therefore, as it does both the circulating fluid and its containing vessels, giving an increased proclivity towards contraction in the one and towards coagulation in the other, this twofold effect of gallic acid, and the perfect safety with which the largest dose may be administered, should render it our sheet-anchor in hæmorrhages, both active and passive.

The ease and rapidity with which it enters the blood render it equally powerful to arrest hæmorrhage throughout the whole body. If the vital stream be oozing in passive flux from relaxed and atonic vessels, it will contract them and steady the circulation; or if a bounding pulse forces an active hæmorrhage through the torn walls of some weakened vessel, it will contract this, and form a firm clot around it, reducing the pulse and the heart's action at the same time.

Where an overdose of gallic acid has been taken, the pulse becomes small and wiry, the face grows pallid, a whizzing sound is heard in the ears, the head feels dizzy, and faintness supervenes. These symptoms arise from the contraction of the capillaries and larger vessels produced by the astringency of the remedy, and the consequent interference with the intra-cranial circulation. But I conceive it would not be possible to poison a patient by the largest dose of the remedy when introduced by the mouth, because the capillary and distal vessels would become too contracted to receive any further supply, long ere a sufficient quantity could be carried into the blood to produce dangerous effects upon the central circulation.

The ease with which gallic acid enters the circulation renders it a most valuable remedy, not merely in hæmorrhages, but also in those diseased habits of body in which excessive secretion becomes a prominent and distressing symptom, and also in some other diatheses, which I will proceed to enumerate.

Dr. Scott Alison, in a paper on Tannic Acid, which appeared in the *London Journal of Medicine* for Jan. 1850, has recommended its use as a tonic in dyspepsia—as a nerve in languor and debility—as tending to improve the quality of the blood—as tending to arrest tubercle and malignant disease—and as valuable in rickets, in phthisis, in bronchitis, when accompanied by profuse expectoration, and in arresting colliquative diarrhoea and exhaustive sweats.

Dr. Burns, of Glasgow, praises the powers of gallic acid in chlorosis, in doses of one hundred grains daily. From a consideration of its effects upon contractile tissues and upon the various solid and liquid constituents of the animal body, we should anticipate benefit from the use of gallic acid wherever relaxation of the one or too great fluidity or dilution of the other were apparent, and experience fully testifies its virtues in the very classes of disease where advantages from its exhibition were predicated.

In the following classes of disease the remedy is worthy of every confidence.

I. In active hæmorrhages, from whatever organ or part of the body they proceed.

II. In passive hæmorrhages, hæmorrhagic diathesis, purpura, etc.

* When tannic acid is administered (Pereira remarks), it becomes changed into gallic acid in its passage through the system; hence, when a remote or general effect is desired, gallic acid is the most proper to be administered. In the topical effect, tannic acid has the greater power.

III. In excessive secretions, as in pyrosis, serous diarrhoea, chronic bronchitis, bronchial flux, profuse night sweats, some forms of dysentery, and perhaps in diabetes.

IV. In atonic states of the alimentary canal and of the body generally, especially in rachitis, and in those cases where a weak and congested state of the capillaries is apparent.

V. As an adjunct to other means in piles, wounds, etc.

I. Where gallic acid is employed in cases of active hæmorrhage, it will by no means interfere with the employment of measures of active depletion, should the plethoric state of the patient appear to demand their use. In my own experience, I have trusted solely to the gallic acid and the local application of cold, and have not ever been disappointed; but cases may arise where an immediate relief to a gorged system may appear necessary, and here gallic acid will be found the most useful aid to the other means applied.

In these cases, the indications point to the introduction of the remedy in such a way as will most rapidly enter the circulation. Time is here of the utmost importance, since life is flowing away rapidly unless the tide be stayed. Therefore, in severe cases, a tablespoonful of a saturated solution of the acid* should be administered every four or five minutes, while with the hand on the pulse we carefully watch its gradual transition from a full though thrilling flow, to a wiry hard beat. Then the hæmorrhage pours less rapidly or totally ceases, while its colour becomes darker and darker until it is often perfectly inky. When this occurs it shews a complete saturation with the acid, which may then be given at much longer intervals, and after a few days be discontinued.

This mode of administration is applicable to active hæmorrhages from all organs, except from the œsophagus and stomach. The exception made in these cases is from the consideration that the remedy would probably be vomited with the blood, and so washed out of the organ before it had time to enter the circulation.

It will therefore be safer, here, not to rely on the exhibition of the medicine by the mouth, but to administer it in large quantities *per anum*. I would still, however, advise that freshly made pills containing the acid should be swallowed in the hopes of acting topically upon the bleeding vessels, of coagulating the blood already thrown out, and of allaying the sickness.

In uterine hæmorrhages, it will also be useful to combine injections of a solution of the tannic or gallic acid with its internal administration; since, where it is possible to act both from within and from without, it must obviously be highly serviceable to do so.

In this, and in the second division of cases, I feel confident that gallic acid will disappoint no reasonable expectation in its curative powers.

II. In the treatment of passive hæmorrhages, much smaller doses of the acid will suffice. It should, however, be fearlessly pushed until the beneficial result is produced. This will generally be coincident with a *feeling of constriction in the forehead and eyes, or with a buzzing sound in the ears and head*; when this occurs, the hæmorrhage will be mostly arrested, and by a continuance of the medicine in smaller doses and at longer intervals for a few days after the total cessation of the disease, a relapse will be avoided.

In passive and chronic cases, I prefer to give the medicine in the form of pills, since the solution, if kept long, undergoes decomposition.

III. The third division of cases requires some little discrimination in the choice of those to which an astringent method of treatment is applicable. It is obvious, that while in some cases excessive secretion is in itself a diseased action, that in others it is an effort of nature to cast out some poison or peccant matter circulating in the blood, and therefore curative. We have examples of the former in pyrosis, and of the latter in the sweats of rheumatism; in

the diarrhoea which precedes erysipelas, and some other disorders, and which proves critical in some fevers. Still, after rejecting all these as unfit cases for the exhibition of gallic acid, a large number yet remain, in which excessive secretions result from debility, or a generally relaxed state of their natural organs, or of the capillaries of the parts whence they are excreted. Where this obtains, there is certainly no remedy which acts more pleasantly and admirably than gallic acid, giving, as it does, general tone and vigour without the slightest tendency to induce febrile excitement.

In *pyrosis*, where this disease is unaccompanied by extensive ulceration, or organic malignant disease of the stomach, or by disease of the liver, the most marked benefit will follow the use of the remedy. Gallic acid, here, not only checks the secretion with a certainty and rapidity I have never seen follow the administration of any other remedy, but it gives general tone to the stomach, increases the appetite, and (what I very little expected when I first used it), in many cases removes constipation. This I can only account for on the supposition that the relaxed atonic state of the stomach which favours pyrosis is continued throughout the alimentary canal, the constipation in these cases arising from want of power in the muscular coats of the intestines to expel the fæces. This want of tonic power is remedied by gallic acid.

The cases of pyrosis which have fallen under my observation, since I have adopted the gallic acid treatment, have been very few; indeed, I believe it to be a very infrequent form of disease in Brighton. Out of 945 cases of general disease, which have come under my care at the Dispensary, during the past twelve months, only eight patients have suffered from this disorder. These have been all females. I have the notes of five of these cases before me.

The first was a female of twenty-five years of age, unmarried; she had been for eight months suffering from pyrosis and obstinate constipation, during which period nearly every remedy of reputed value had been administered. She was completely cured in two days. I kept her under my care for three weeks, continuing the gallic acid and occasional doses of castor oil. I have seen her since, and though some months have elapsed, she has remained perfectly well.

The second case was a female, forty-nine years of age. The pyrosis ceased after the second dose of the medicine. She discontinued the treatment a week afterwards, and had a slight return the following morning, which again gave way to the medicine, and by a continuance of the pills for three weeks, she has remained perfectly well ever since.

In the third case, the remedy proved equally successful. In the fourth, a married woman of thirty-five, who had suffered from the disease nine months, the distressing symptoms abated considerably at the fourth day, and entirely left her on the eighth day.

In the fifth case, a female of forty-five, there was no return after the first dose.

In one case only have I found it fail, and this woman is still under my care; she is forty-nine years of age, and is, I fear, the subject of malignant disease, together with organic disease of the liver. All the first five cases presented a general similarity in the relaxed muscular fibre of the body, and pale watery appearance of the mucous surfaces.

In *diarrhoea* and *dysentery*, after the removal of any irritant matter by a gentle aperient, I have found the diseases yield, and a healthy tone easily restored to the intestinal membrane, by moderate doses of gallic acid every two or four hours, with a teaspoonful of castor oil every morning.

There is a class of *phthical* cases to whom gallic acid is an almost inestimable boon. I allude to those in whom the expectoration is frequently tinged with blood, and who no sooner appear to improve a little in general health and strength, than slight hæmoptysis recurs and again reduces both. I have at this time several such cases under my care, who are improving slowly yet steadily under five grain doses of gallic acid taken three times daily, in conjunction with cod-liver oil and other remedies. In one of these

* Made with hot water and a little spirit, it will contain about five grains.

cases, the man has been now under my care for twelve months. When I first saw him, he was reduced almost to a faint extremity by the constant hæmoptysis and profuse expectoration, and suffered so greatly from dyspnoea as to be unable to follow his occupation (that of a painter). Three vomices have discharged themselves since he has been under my care, and yet he is improving, and has for the past ten months been able to resume his business, and to continue it all through the winter, and can walk up hill or mount stairs without much distress. While he continues both cod-liver oil and gallic acid, he does well; if he leaves off the one, his hæmoptysis returns; or if he discontinue the other, he becomes weak and languid.

Gallic acid is also valuable in conjunction with the oil, in enabling the stomach to bear it without nausea.

Another great benefit to phthisical patients from the exhibition of gallic acid is the tone it imparts to the stomach, restraining the inordinate appetite and promoting its power of digestion. The stomach is often greatly enlarged in this disease, and its coats relaxed and atonic, hence the benefit alluded to.

In the distressing *night sweats* and *diarrhœa* which characterise some stages of phthisis, the remedy, though of the utmost service, requires a nice discrimination in its use. It must be commenced in small doses and carefully increased, since the cough will be aggravated materially if the secretions be too suddenly suppressed. But if gradually increased doses be given, I have found that not only are the sweats and diarrhœa moderated, but that the breathing becomes more easy, the expectoration causes less effort, and the digestion greatly improves. The reason of this varied improvement easily appears, if we bear in mind the single action of gallic acid, its solubility and entrance into the blood. It contracts the capillaries and glandular apparatus of the alimentary canal. It contracts their walls, and diminishes their general calibre. It gives the same power of contraction to the elastic and muscular tissues of the lungs, thus enables them to expel accumulations of mucus or pus, and it produces the same action on the skin, enabling it to check the exhausting exudation from its surface.

It is evident, while contemplating these various demonstrations of the power of the remedy, that in order to produce benefit in phthisis, they must be only gradually brought to bear on the secretions, and that great care must be exercised lest too sudden an impression be produced.

In *chronic bronchitis* the same caution must be used in checking the profuse expectoration, but I know no remedy more easily managed than gallic acid, and none so calculated to permanently arrest the diseased secretion, and to restore tone to the bronchial tubes and their lining membrane. I ought parenthetically to observe that I have always found that pencilling the tonsils and uvula with a solution of nitrate of silver (of from five to ten grains to the ounce), night and morning, greatly assists in relieving the cough both of phthisis and bronchitis. The dose I have given in these cases has been from five to ten grains *ter die*.

In *diabetes* we should expect some benefit from gallic acid. I have not had a fair opportunity of trying the remedy in this disease, yet I think the following case gives some hope that if perseveringly continued, the disease might be arrested, in some cases, by its use.

CASE. Henry H—, aged fifty-five, a labourer, tall and well formed, but emaciated looking. He could not give a very clear history of his case. For some months he had not felt well. He had suffered from rheumatic pains for years; once had the scurvy. He had noticed a great increase in his urine for two months, and during the night passed about eight pints. He had not noticed how much during the day, but thought about the same quantity. He had great thirst, and experienced a pain in the loins, which seemed connected with a sickening pain felt in the abdomen. There was no tenderness on pressure either in the loins or abdomen.

The tongue was brown in the centre, with white fur bordering it, while its margin was pink and indented by the

teeth. The bowels acted regularly, and the appetite was good. Pulse 75, soft and compressible.

The urine was of specific gravity 1040, examined by Marsh's test. On boiling with liquor potassæ, it became of the colour of port wine.

I ordered him five grains of gallic acid every three hours.

6th. He passed twelve pints in twenty-four hours.

7th. He passed fourteen pints in twenty-four hours. I increased the gallic acid to a drachm in twenty-four hours.

8th. He passed eleven and a half pints in twenty-four hours; he had less thirst. Specific gravity, 1040.

9th. He passed ten and a half pints; and had still less thirst.

10th. He passed ten and a half pints, of specific gravity, 1040.

11th. He passed ten pints.

12th. Eleven pints were passed.

13th. Fourteen pints were passed (he had eaten some apples).

14th. Twelve pints were passed. I increased the gallic acid to a drachm and a half in twenty-four hours.

15th. He passed ten pints.

16th. He passed nine pints.

He now went home into the country. He returned to Brighton on the 20th; the quantity of urine passed was still less, and he felt better, as he said, heartier and less thirsty.

21st. He passed seven pints only. Specific gravity, 1037.

22nd. Six pints were passed. He now felt so much better that in spite of my wishes he returned home, and I have lost sight of the case.

I should have continued to increase the dose of gallic acid, could I have watched him closely. His pulse still remained full and gained in power, and he had no unpleasant head symptoms. I do not consider that I fully got him under the influence of the acid, and without this I could not expect a cure.

IV. Since meeting with the memoir of Dr. Scott Alison, I have tried gallic acid pretty extensively in cases of rachitis and tabes mesenterica, and have invariably found the secretions become healthy under its use, losing that offensive smell and unhealthy appearance, while the flabby relaxed muscles become firm; and children who have been unable to walk, though two or three years old, have in two or three months become playful, lively, and active, walking and standing well. It certainly acts in these cases as a tonic, and as the very best form of tonic, through its astringent powers; for it contracts the relaxed vessels, which allowed so constant and weakening a drain on the system; and thus allows the blood to retain its own: it arrests the loss of its nutrient particles, and turns these from the channels of excretion into their natural paths of nutrition, giving at the same time firmness and tone to the muscular and elastic tissues throughout the body.

I know of no other mode in which we can account for the rapid improvement which follows its judicious use in cases of rachitis and tabes. Not only does the general health improve rapidly, but I can fully corroborate Dr. Scott Alison's observation that the excretions lose their unhealthy character and offensive odour; the appetite becomes reduced where it was excessive, and increased where it was defective; and the colour increases more rapidly even than where iron has been given. The sour smelling perspiration ceases, the flesh becomes firm, and the child desires exercise and play where it formerly lay about listless and weary. I have used the gallic acid in these and other cases, in preference to the tannic, for the reasons mentioned in the early part of my paper.

There is another large class of invalids, or rather there is another class of persons in whose peculiar constitution of body the gallic acid becomes almost invaluable as a corrective. I allude to those often hastily called plethoric, who are stout and florid, but whose pulse is feeble, whose muscular system is relaxed: cold turns them blue, and heat causes profuse perspiration. They appear oppressed and languid, and unfit to take violent exertion. These are

cases, not of plethora, but of passive congestion; and the blood-vessels, partaking of the generally relaxed and atonic state of the body, occasionally give way, and apoplexy or hæmoptysis occurs, from moderate exertion, or from undue excitement. It is surprising how very rapidly these patients improve in their general health under a course of gallic acid—how soon strength is given to every fibre, and the loosened textures become bound up with tone; the congested appearance of the countenance disappearing, and the little gorged capillaries vanishing in the general colour of health, while the tongue becomes firmer, and the pulse more full and powerful.

v. In the fifth class of cases, piles, wounds, etc., the effects of the external use of tannic acid and its preparations, are well known; and where severe hæmorrhage results from slight wounds, etc., as will sometimes occur in those of hæmorrhagic diathesis, the internal administration of gallic acid will greatly assist in arresting the flow of blood. It is probable that in some affections of the skin, and in varicose veins, gallic acid may prove serviceable.

In conclusion, I would once again seek to impress the fact that, in severe cases of hæmorrhage, gallic acid must be given fearlessly, and until complete saturation of the system is accomplished.

28 Old Steine, Brighton, June 1854.

USE OF BELLADONNA IN VARIOUS AFFECTIONS MARKED BY CONTRACTED PUPILS:

AND ON THE NON-SUSCEPTIBILITY OF THE DOG TO THE ACTION OF CERTAIN POISONS.

By W. LAUDER LINDSAY, M.D., late Resident Physician of the Surgeon Square Cholera Hospital, Edinburgh.

LAST winter I purposed making some experiments on the effects of belladonna in the coma, with contracted pupils, which sometimes occurs during the typhoid stage, or, as it is commonly designated, the "consecutive fever", of cholera. They were suggested to me by the success of some trials of this drug, in the Royal Infirmary of Edinburgh, made by my friend Dr. Anderson, in the coma, with contracted pupils, of continued fever, and of opium poisoning. Its good effects, apparently (to a certain extent, at least), as an antidote to poisoning by opium, was manifest in two cases in particular.

The first case was a man labouring under delirium tremens, who had accidentally taken, in thirty-six hours, two ounces of the solution of muriate of morphia. While he was in a state of deep coma, six drachms of tincture of belladonna (prepared by percolation in the proportion of four ounces of the leaves to two pints of rectified spirit) were given in doses of about one drachm every half hour. In four and a half hours, the patient was out of danger.

The second case was a woman, who had swallowed six drachms of tincture of opium, and in whom the means usually resorted to in cases of opium poisoning had failed in rousing her from coma. Within the course of an hour, she took ten drachms of tincture of belladonna (freshly prepared); and, in a few hours thereafter, she also was out of danger.

Belladonna had been previously tried elsewhere, with success, in delirium tremens. Our anticipations of its success were founded: 1. On the physiological fact that this substance—or its active principle, atropin—causes dilatation of the pupil when applied externally, or administered internally; and 2. On the supposition that this phenomenon might be a sign of, or co-existent with, a change in the condition of the brain, antagonistic to that of which the contraction of the pupils, with or without coma, in the diseases above mentioned, is a result. Or, in the words of Dr. Anderson,* it appears probable that "if we give an agent whose action on the brain is opposite to that of opium, so soon as its minor physiological effects are developed, the

evidence of the action of opium will disappear." Whether the theory of its action were correct or not, the success of its limited practical application appeared to me to justify its being more extensively tried in other diseases, attended by a similar condition of the brain or pupil.

In connexion with this subject, we were anxious to ascertain, by experiments on the lower animals, whether opium and belladonna—or their respective active principles, morphia and atropin—would uniformly and in all circumstances antagonise, or act as antidotes to, each other. I am not aware that these drugs have been much employed experimentally in the way here referred to. Several authors have, however, hinted at the probability of their success when thus applied, founding their opinion either on their physiological actions or on the resemblance of their effects to certain diseases, in which the administration of the one or other is generally known to be beneficial. For example, Dr. Graves states somewhere in his *Clinical Lectures*, that "in continued fever, with contracted pupils and coma, we are perhaps entitled to suppose that if we can, by an agent administered internally, so affect the brain that the pupils shall become dilated, the other symptoms of cerebral derangement will also be removed";† and Dr. Garrod, of University College, London, mentioned in his introductory lecture last session that, "from the resemblance of the poisonous action of belladonna to delirium tremens, in which disease opium is a most approved remedy, it is probable that, in poisoning by belladonna, opium may be found advantageous". Dr. Anderson states that he knew of several cases where hyoscyamus appeared to antagonise the effects of morphia—that is to say, where morphia alone produced its usual soporific effect, but, along with tincture of hyoscyamus in similar doses, and under otherwise similar circumstances, it produced no effect. This leads him to suggest that many of the solanaceous order of plants may likewise be found useful as antidotes to opium. The active principles of many of the solanaceæ "act as exaltants of the nervous system, increasing the rapidity of the respiration, and the strength and frequency of the pulse, causing delirium of various grades of violence, accompanied till death with dilated pupil, and terminating in coma, probably merely the result of exhaustion of the powers of the system. Now these are effects quite the opposite of those observed daily as the consequences of the administration of opium. That drug exerts its poisonous influence as a depressant of the vital powers, diminishing the number of respirations, weakening the heart's action, and causing coma as one of the first alarming evidences of its effects."

This investigation led us into a still wider field of inquiry, namely, to test the antidotal or antagonistic effects of certain other powerful poisons, which possess opposite physiological actions, viz. strychnia and brucia, conia and nicotina, etc. For these various purposes, I selected several dogs, which I had formerly employed in a series of experiments on the artificial communicability of cholera.† To them we gave various doses of the poisons above mentioned, with the following effects.

EXPERIMENT I. I injected by a common syringe into the mouth of a large, powerful, healthy retriever dog, a drachm of tincture of opium. This apparently produced no effect: he was allowed to run at large a few hours. In the evening, he was made to swallow, in small quantities, enveloped in pieces of bread, no less than twenty grains of muriate of morphia; he was tied up in a room by himself for the night. Next day, he was very quiet and even appeared drowsy; he whined constantly as if suffering from abdominal pain, and obstinately refused all food, on which he looked with evident suspicion. There was neither contraction of the pupil nor any approach to coma. He continued in this condition three days, when he became restless and discontented; but ran actively about the hospital grounds. On the fourth day, he swallowed food eagerly, and, though still whining occasionally, he became much more lively. From this period, he

* Transactions of the Physiological Society of Edinburgh, in the "Edinburgh Monthly Medical Journal" for April 1854.

† Paper (published separately) by Dr. Anderson, "On the Effects of the Internal Administration of Belladonna in Poisoning by Opium".
† Edinburgh Medical and Surgical Journal, April 1854.