made in stages. It was at this time that Dr. L. Cole-Baker of Southsea at the request of the family saw the child with me. The condition was one of improvement all round; the temperature dropped to the normal by the 12th and the child gradually gained strength every day. So far as is possible to judge complete recovery of all the functions of the nervous and muscular systems has occurred, it now (at the time of writing) being six weeks since the first serious symptoms were observed. The inunction is being continued, applied at the nape of the neck or between the shoulders, a piece as large as a filbert nut being rubbed in once a day; for the first fortnight this was applied twice a day. The mixture, two and a half minims of perchloride of mercury, one grain of iodide of potassium, and two grains of bromide of potassium, with syrup and water every four hours, is now alternated with the syrup of iodide of iron. The patient is on a full milk diet with beef-tea and cod-liver oil emulsion. Lumbar puncture was impossible as the parents would not consent. As there were difficulties in connexion with obtaining an opsonic curve tuberculin was not tried. There seems, however, little doubt that this was a case of tuberculous meningitis. Three medical men each without previous knowledge of the opinion expressed by the others at once gave the same diagnosis.

Bearing in mind the case above referred to in THE LANCET and the fact mentioned to me by Dr. Nash that he read of a similar case in "Whitla's Dictionary of Treatment," and now my own case, it seems that there are occasional cases of apparently genuine tuberculous meningitis cured by mercury, especially if (as in this case) the inunction is commenced early, is quickly pushed, and the patient's strength as far as possible maintained. Children usually bear mercury well and in this case there have been no apparent ill-effects of any kind. The child is now quite well, is on ordinary diet, and goes out on fine days.

Southend-on-Sea.

SOME CONSIDERATIONS ON THE TREATMENT OF INTERNAL HÆMORRHAGE BY THE USE OF DRUGS.¹

By W. E. DIXON, M.A. CANTAB., M.D. LOND.

(From the Pharmacological Laboratory, Cambridge.)

So much has been written on the treatment of internal hæmorrhage by the exhibition of drugs and so much misunderstanding has arisen with regard to the pharmacological action of those drugs which are commonly employed in these conditions that I venture to give some short account of their mode of action, especially with reference to the relative effects on different vessels.

When it is possible to apply a drug directly to a bleeding point the hæmorrhage may, as a rule, be stopped with certainty and ease by bodies which either coagulate proteid or which constrict the bleeding vessels. The tannins and ferric chloride may be taken as examples of the first group and these act by blocking up the smaller vessels with the precipitated serum-proteids; as an example of the second group adrenalin, cocaine, or digitalis may be mentioned. This principle of treatment is correct and such drugs may be employed beneficially in hæmorrhage from the stomach, the nose, the uterus, or other parts where the drug actually comes in contact with the bleeding point. But when the drug must be absorbed and pass into the blood before it can reach the seat of hæmorrhage, exactly what happens to the bleeding vessel is not so easy to determine. In the first place it is necessary to know what has become of the drug; has it, for example, undergone any change in the body which renders its action inert? Secondly, supposing the drug to have reached the blood and to have retained its activity as a vaso-constrictor, then it must exert its action on the vessels of the bleeding point, but not more on these vessels than on the other vessels of the body; and supposing the bleeding vessels in question are poorly innervated or poorly supplied with muscle then the effect on the other vessels may entirely overshadow the effect on the bleeding vessels, so that the large increase in blood pressure

from the former effect may overcome the constriction of the more feebly innervated vessels.

The various tannins, as is now well known from the work of Stockman and others, are not absorbed as such into the system; not more than about 1 per cent. reaches the blood in the form of gallate of sodium. Now gallate of sodium does not constrict vessels; indeed, any tendency it has on their calibre is always on the side of dilatation, nor does it increase the tendency of the blood to clot, so that the tannins cannot be regarded as drugs of value in the treatment of internal bleeding. The active principle of the suprarenal glands has been described as exerting a decided action in checking internal hæmorrhage, even when administered by the mouth. Once again we know that adrenalin is destroyed in the stomach and that none of the active constituent reaches the blood; at least, there is no evidence of its absorption as shown by vaso-constriction or rise in blood pressure. I have verified these statements both in animals and on man; in the latter 60 minims of 1 in 1000 adrenalin well diluted produced no effect on the blood pressure as recorded by the Hill and Barnard instrument, whilst in animals even larger doses have been given by the mouth without producing vascular changes. Whereas if even one quarter of a minim of a solution of this strength is injected into the circulation of a cat or if two minims are injected into the circulation of a man there is a decided rise in blood pressure, acceleration of the pulse, and the other signs of suprarenal action. Even when adrenalin is injected subcutaneously it still produces no effect on the systemic blood-vessels. I have tried this by injecting under the skin of the forearm ten minims of a 0.1 per cent. solution and simultaneously observing the blood pressure on the opposite arm. The pressure remained quite constant. Similar effects have been observed by Janeway in America, Elliot in Cambridge, and others. The adrenalin produces a local effect and is apparently destroyed locally. So that neither tannin nor adrenalin when administered in the manner described can reach the blood in a form in which it is possible for them to influence the vaso-motor system.

But we have several drugs which will induce vaso-constriction of internal vessels with certainty. Adrenalin administered intravenously will do this and ergot, the digitalis group of drugs, lead, and other substances are effective when administered either by the mouth or subcutaneously. This vaso-constriction does not affect all the vessels in equal degree; some may be intensely constricted, whilst others, from an absence of nerve supply or poor development of the muscle in their walls, may remain almost or entirely unaffected. In considering the condition of the blood-vessels in any organ of the body two factors must be noticed: (1) the general blood pressure; and (2) the tendency to constriction produced by the local action of the drug on the organ. The latter effect can only be obtained by perfusion of the isolated organ with defibrinated blood outside the body, for it is only in this way that the general effect of the drug on the other vessels, resulting in their constriction and so of a general rise of blood pressure, can be avoided. Such experiments invariably show us that the vessels of the splanchnic area become constricted much more intensely than those of the muscles, brain, lungs, &c. So that if one may take a hypothetical case in which a drug is producing constriction of the vessels by acting on their plain muscle fibre it will produce intense constriction of the splanchnic vessels, a somewhat smaller constriction of the vessels supplying the skeletal muscles and a still smaller constriction of the lungs, liver, and brain. Now, this effect in, let us say, the lungs, brain, or liver is of so feeble a character that the tendency to constriction is entirely overcome by the rise in blood-pressure from the more intense splanchnic constriction, so that instead of constricting these vessels dilate and the organ becomes congested. This statement is true for all the drugs in common use which are employed to produce vaso-constriction. The vessels of the intestines and splanchnic area constrict most, then follow the skeletal muscles, kidney, spleen, uterus, &c., and lastly the liver, lungs, brain, and coronary vessels. The lungs and coronary vessels receive no nerve supply to their muscles, whilst that to the cerebral vessels and liver is of the most meagre description, if indeed it exists at all.

We are now in a position to examine in further detail the effect of those drugs which produce vaso-constriction. Adrenalin is the first, and this drug, as already shown, induces a specific action only when it is injected into the

¹ The substance of a paper read before the Cambridge Medical Society in November, 1905.

circulation. It has been clearly shown that adrenalin acts upon the sympathetic nerve-endings in the muscles and therefore it induces vaso-constriction just in proportion to the development of these endings. Thus the constriction of the vessels of the splanchnic area is intense; it is less in those of the limbs, very feeble in the cerebral vessels, and absent in the coronary. Hence supposing a dose of adrenalin is administered intravenously to a man, the blood pressure rises mainly as the result of the constriction of the splanchnic vessels and the blood being squeezed out from these vessels collects in certain organs the vessels of which do not respond to adrenalin—i.e., which are not innervated—especially the lungs, and to a less extent the liver and the brain. Not only are the vessels of the lungs and the brain not constricted but they are in a state of very considerable congestion.

Adrenalin has a very decided action on the heart, again by acting on the sympathetic endings; it beats much more quickly and vigorously and I have often, by continued administrations of small intravenous injections, kept an animal poisoned by toxins alive which, when these injections are stopped, dies immediately from cardiac failure. I mention this fact to draw attention to the powerful cardiac action of adrenalin which might be invaluable in tiding over an emergency and which has not yet received proper therapeutic recognition.

The use of ergot in the treatment of hæmorrhage is also much misunderstood. It produces constriction of the vessels through its action upon certain nerve centres. It does not, like adrenalin, act on peripheral nerve endings; this has been shown by many observers and I have verified their statements by perfusing the drug through peripheral vessels which in all cases tend rather to dilate than to constrict. Ergot, then, acting through the nervous system, produces effects somewhat similar to those produced by intravenous injections of adrenalin. Whilst it gives rise to intense constriction of the splanchnic and limb vessels, it induces congestion of the liver, lungs, and meninges. There is another fact about ergot which has not received adequate attention. I refer to its action on the heart. Under the influence of this drug the vigour of the heart increases and its output is augmented. This action is on the cardiac muscle, since the effect can be produced on the isolated heart. It is quite a different effect from that of digitalis, since there is no slowing of the beat and no action on the vagal mechanism. The effect is quite considerable, more pronounced than that of digitalis, and thoroughly deserves the

hours after the administration of a single dose. The practical effect of injecting ergot into man is to produce a rise in the systemic blood pressure much greater than that which can be obtained by any of the digitalis group of drugs. This increase of pressure is mainly vaso-motor but is partly cardiac. The vessels which do not constrict are the coronary, cerebral, and pulmonary, so that the lungs and brain being congested any bleeding from them will certainly be augmented. Injections of ergot are legitimate for the purpose of arresting hæmorrhage only when the lesion is in some part of the splanchnic system.

Of the digitalis group of drugs three only require attention—digitalis, strophanthus, and squill. Squill is much the most effective in constricting vessels, then follows digitalis, and, lastly, strophanthus, so that if the use of one of these drugs be desirable for vaso constriction that one should be squill. Now squill produces its action on plain muscle in two ways—first, by exciting the nerve endings, and secondly, the muscles; so that vaso-constriction does not in this case depend upon the presence of vaso motor nerves. But nevertheless the effect of dosing with squill is much the same, as far as the vessels are concerned, as dosing with ergot—that is, the splanchnic vessels constrict and the pulmonary and cerebral dilate passively. The latter vessels are relatively poorly supplied with muscle and when the blood pressure rises the feeble attempt which the drug makes to diminish their calibre is overcome by the augmented blood-pressure. On the coronary vessels the same order holds, as Dr. G. S. Haynes has shown in this laboratory—that is, the squill is most active as a vaso constrictor and strophanthus least. This is particularly interesting because strophanthus is far and away the most toxic drug to the ordinary musculature of the heart, a good tincture of strophanthus being eight or nine times as toxic as a good tincture of digitalis, and yet it has comparatively little effect on the muscle of the heart vessels.

There are still other drugs which are occasionally used for their effect on vessels. They are veratrine, barium, and certain of the heavy metals, particularly lead. These drugs act directly on all forms of muscle and produce tonic contraction. Hence they produce considerable and very persistent constriction lasting longer than that produced by a nervous action. But, again, what has already been said about squill applies also to these drugs; it is doubtful if they produce other effect than passive congestion of the liver, lungs, and brain. Their only legitimate use is for intestinal, uterine, or other hæmorrhage from the splanchnic

Isolated rabbit's heart perfused with Ringer's solution and recording by the method of Langendorff. At A 0.5 per cent. liquid extract of ergot was added to the perfusing fluid. The heart beats more quickly and much more forcibly. Time = seconds.

attention of clinicians (see illustration). The objection to the use of ergot in any form is its present want of uniformity; the greater part of that which is on the market is quite inactive and much has so feeble an effect as to be useless in the treatment of disease. Until it is suitably standardised these objections must continue to hold.

One great difference between the action of adrenalin and that of ergot is that the effect of the former drug is very transient, being oxidised in a minute or two, whilst that of ergot is much more prolonged, the effect lasting several

vessels and even here it may be questioned whether their action is desirable.

I have briefly endeavoured to show that the tannins, adrenalin, digitalis and its allies, ergot, veratrine, barium, and lead are all worse than useless for hæmoptysis or hæmorrhage from the brain or the liver. Upon what drugs, then, can the physician rely in these conditions? First, it is of the utmost importance to prevent any stimulation of the heart or vaso-constriction, either of which may be produced very readily reflexly by any mental disturbance. The most efficient

prophylactic is to diminish all sensory reflexes by means of morphine. Now morphine has no action on the heart or vessels directly, but by inducing quietness, placidity, and a desire for sleep it prevents sudden movements, excitement, and other effects which induce cardiac acceleration and reflex rise of blood pressure. In this way it will probably do more good than any other drug. There is, however, another type of drug which it is possible to employ advantageously, that is one which augments the clotting power of the blood. Calcium is *par excellence* the drug for that purpose. It should be administered preferably in a dissociable form such as the chloride. If the salts of calcium are taken by the mouth a certain time must elapse before sufficient reaches the blood to produce an effect on its time of clotting. Unfortunately, however, most of the cases of bleeding which one sees are urgent and such that the administration of calcium by the mouth is of little value. In these cases the drug should be given subcutaneously. One or two grains administered in this way will diminish the time of blood-coagulation of a healthy man to about a half. For this purpose the calcium chloride should be neutral and injected deeply into the subcutaneous tissue, so that as far as possible the local irritant action of the drug may be avoided. In these cases of hæmorrhage perfusion with saline is occasionally performed. Dr. C. J. Coleman has lately shown in this laboratory that such dilution of the blood increases the time of clotting sometimes to two or three times that of normal. Perfusion is, however, rarely undertaken until the bleeding has ceased.

Finally, I should like to point out that it is a well-known clinical fact that most cases of internal hæmorrhage such as hæmoptysis stop without assistance. It is not possible to draw correct conclusions as to the action of a drug from its administration in two or three isolated cases of bleeding. The cessation of hæmorrhage after the exhibition of a drug is in itself no proof that the effect was produced by the drug, and I cannot doubt that in many instances where such drugs as ergot have been employed to stop hæmorrhage that their action has been rather to delay the desired effect.

Pharmacological Laboratory, Cambridge.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

A CASE OF MYCOSIS FUNGOIDES SUCCESSFULLY TREATED BY THE X RAYS.

BY G. G. STOPFORD TAYLOR, M.D. DURH.

THE patient, who was a man, aged 47 years, was under my care at the Liverpool Skin Hospital, to which he had been sent by Mr. William Mill of Upholland, Wigan. The history was to the effect that in January, 1903, he first noticed a reddish painless lump of the size of a walnut over the middle of the spine. He did not apply any remedies and after two or three months the lump disappeared. Before its disappearance five small similar tumours appeared over his left ribs. They never attained a larger size than that of a bean and went away spontaneously about the same time as the large lump. For about 12 months he enjoyed good health and saw no more tumours. At the end of that time there appeared scattered over his back a number of painless, reddish lumps of various size which were freely moveable. So far as the patient observed, his general health did not seem to be affected by them. The tumours grew slowly but steadily. When he presented himself at the hospital on Dec. 18th, 1905, there were scattered over his back a number of tumours of varying size; three of these were large, the largest being of about the size of a duck's egg. Large areas of the adjacent skin showed the premycotic condition, which in this case was of the erythematous type, one large disc being very distinct. One of the smaller nodules was removed for the purposes of histological examination, which was made by Dr. F. Perera Wilson. On cutting into the tumour it appeared to the naked eye as a round mass, much denser and firmer than the

surrounding tissue and sharply marked off from it. Microscopical examination showed a round mass of densely packed cells in the corium. The cells consisted of connective-tissue cells of various shapes, numerous small round cells, and a few plasma cells. No mast cells were found. In some parts the cells were less deeply stained and were crenated in appearance; granular debris was scattered between them. In some parts of the specimen, especially round the periphery, the cells were arranged in columns. Outside the main mass foci of cells were scattered through the corium. The epidermis was thinned and its interpapillary processes flattened out; there was intercellular œdema.

Treatment by the x rays was given by Dr. Walter C. Oram who is in charge of the electrical department of the hospital. Exposures of ten minutes' duration each were employed twice a week at a distance of nine inches from the anticathode, 0.5 Holzknecht's units being administered at each sitting with rays of penetration 7 on Benoist's scale. In all 15 exposures were given. The facility with which the tumours yielded to the treatment was remarkable, since improvement was noticed after the third sitting and they were completely level with the skin before the hair fell from the adjacent parts of the back. Although the patient was not aware of any deterioration of his general health while the tumours existed he says that since they have disappeared he has felt much stronger. His friends have also told him that he is looking better.

Liverpool.

A CASE OF STRANGULATED RICHTER'S HERNIA AND NON-STRANGULATED APPENDIX IN THE SAC OF A FEMORAL HERNIA.

BY H. REGINALD BURPITT, M.D. BRUX., M.R.C.S. ENG.,
L.R.C.P. LOND.

A SHORT time ago I was called to see an old lady, aged 76 years, who had been a hospital nurse. On my arrival there was no one else in the house. The patient complained of pain in the legs and abdomen and sickness; she had vomited about three pints of matter, the most recent of which was fæcal. Her history was that she had suffered from a rupture for some months back which felt hard and was at first of the size of a walnut. It gradually became larger; was at first reducible, but for the last few weeks it could not be replaced. There was a great deal of pain. The bowels acted freely throughout. On the day before I saw her she had fallen down, when the pain became worse and vomiting began and continued. On examination there was a swelling of about the size of a hen's egg which had issued through the right femoral ring. It was dull on percussion, tender, and irreducible. After taxis had been applied for a short time unsuccessfully preparations were made for operation. On cutting down the sac was found to be much thickened and to the inside the appendix was found to be adherent at its tip; it was otherwise in a normal condition. A Richter's hernia of the ileum was also present; this, unlike the latter (and herein lies the chief interest of the case), was congested and covered with lymph. The operation was completed, there was no more vomiting, and the patient made a speedy recovery and convalescence.

Llanarthney, Newport, Mon.

CREOSOTAL IN THE TREATMENT OF CROUPOUS PNEUMONIA.

BY J. ALLAN, M.B., CH.B. EDIN.

THE patient in the following case was a youth, aged 17 years, who was admitted to Ayr Hospital on April 23rd, 1905, suffering from right-sided croupous pneumonia.

The history of the illness was as follows. On the previous day he went out to work as usual in the morning. He, however, felt cold and shivery and had pain in the right side of his chest. When he returned home for breakfast he felt weak and could not eat anything. He went to bed and sent for a medical man who diagnosed pneumonia and advised his removal to the hospital. On admission he was found to be a rather anæmic-looking youth of fair development and muscularity. His breathing was rapid and laboured and there was slight cyanosis. He complained of pain on the right side of his chest, the pain being aggravated when he