

THE PITUITARY BODY

AND THE

THE THERAPEUTIC VALUE OF THE INFUNDIBULAR EXTRACT IN SHOCK, UTERINE ATONY, AND INTESTINAL PARESIS.*

BY

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Two years ago I had the honour of reading a paper¹ before the Liverpool Medical Institution on the calcium metabolism, with special reference to the ductless glands and the female genital organs; and I then indicated some of the lines on which our work was being carried out, and hinted at the results already obtained in regard to the pituitary body. An account of the experiments carried out by Dr. Hick and myself up to the end of July, 1908, was published in the BRITISH MEDICAL JOURNAL² early in this year; and although in these papers it was pointed out in what way clinical applications were possible, I have often been asked if we had got any results of practical value. It is for this reason that I now record some of the clinical results dependent on a small portion of that work—namely, the therapeutic value of the extract made from the infundibular portion of the pituitary body.

HISTORICAL.

During the first half of the last century, before the spirit of experimental inquiry in regard to medical problems became the rule rather than the exception, it was the common custom to relegate to the lumber room of scientific knowledge those portions of the human anatomy the functions of which were not apparent. Further, they were "dumped" in the corner reserved for "evolutionary" or "rudimentary" relics.

Now a little consideration, quite apart from experimental

evident that we have no right to regard as rudimentary those portions of man's anatomy which present, when submitted to a very casual naked eye and microscopical examination, if not a higher and more complex formation than is seen in the lower animals, at least one that is of equal development. In connexion with the structure under discussion, I may point out that there is little, if any, development of the posterior portion of the pituitary body in elasmobranchs, whereas it is well developed in the higher mammals and in man.

It was not until 1894 that the wonderful properties of the extract made from the adrenals were described by Oliver and Schäfer.³ In 1895 these workers investigated

also the physiological effects produced by an extract made from the pituitary body, and certain other extracts, such as those made from the spleen and thyroid.⁴ While adrenalin sprang into fame, the pituitary body, which undoubtedly deserves a nimbus of its own, remained with its light hidden beneath the very brains that should have recognized its virtues.

ANATOMY AND DEVELOPMENT.

The pituitary body situated at the base of the brain in the depression of the sphenoid bone, known as the sella turcica, is a small rounded organ, and consists of two parts—an anterior lobe (hypophysis), which is the larger, and more or less encloses the posterior (infundibular) lobe. This posterior lobe is connected with the outer aspect of the floor of the third ventricle by the stalk known as the infundibulum (Figs. 1 and 2).

Structurally the anterior lobe somewhat resembles the fetal thyroid, and consists of an irregular glandular organ composed of cubical or polygonal epithelial cells. These are separated by connective tissue richly supplied with blood vessels.

The posterior lobe, which is divided from the anterior by the epithelial cells of the pars intermedia, is of a totally different composition, and consists of a ground-

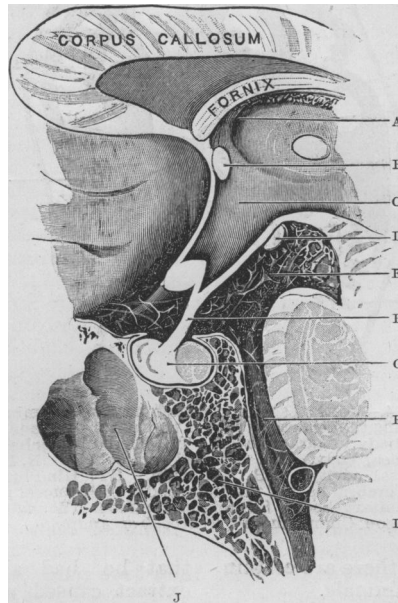


Fig. 1.—Mesial section through the pituitary region in the adult. A, Foramen of Monro. B, Anterior commissure. C, Ventricle III. D, Corpus mammillare. E, Sub-arachnoid tissue in cisterna basalis. F, Infundibulum. G, Pituitary body. H, Cisterna pontis. I, Basio-occipital. J, Sphenoidal sinus. (Cunningham.)

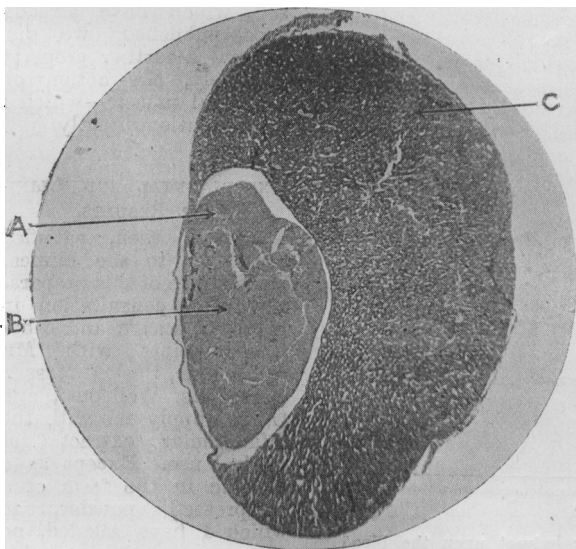


Fig. 2 (Low power).

The pituitary body (cat). A, Pars intermedia (infundibular body—posterior lobe). B, Pars nervosa (infundibular body—posterior lobe). C, Hypophysis (anterior lobe).

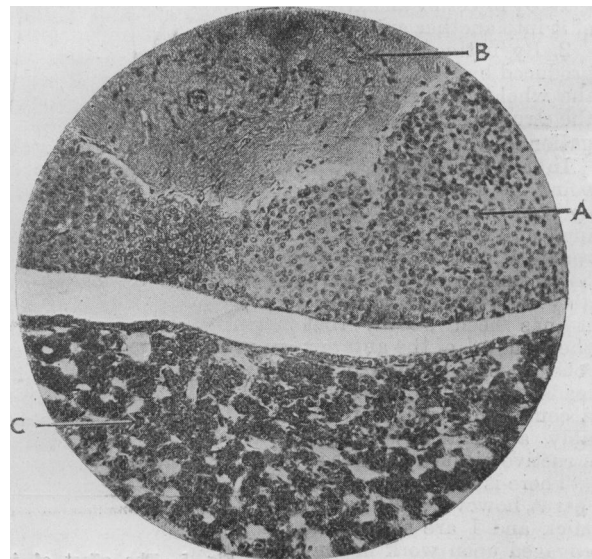


Fig. 3 (High power).

investigation, might have led to a very different attitude in regard to some of these structures. For it is self-

* Read before the Liverpool Medical Institution, November 4th, 1909.

work of ependyma and neuroglia cells and fibres containing islets of epithelial cells (Fig. 3).

The development in man is interesting and worthy

of passing notice. The anterior lobe, whose structure so much resembles that of the thyroid gland, arises from the stomodæum. A hollow outgrowth (Rathke's pouch), lined with ectodermal cells, grows up from this space into the head (Fig. 4). This upgrowth, which forms a hollow vesicle, is gradually cut off from the stomodæum, and becomes isolated in close apposition with the base of the fore-brain. The pars intermedia is derived from the same source.

In passing it may be mentioned that the thyroid gland is developed from an outgrowth from the primitive pharyngeal cavity, and its epithelial elements are, therefore, hypoblastic in origin.

The pars nervosa of the pituitary body is formed by a downgrowth from the floor of the third ventricle. This downgrowth expands at the extremity (posterior lobe) where it comes into relation with the anterior lobe, and remains connected with the brain by the hollow stalk which, as already stated, is known as the infundibulum. The infundibulum and posterior lobe should be called by the inclusive name "infundibular body." In some of the lower animals, such as the cat, a cavity may be seen in the posterior lobe directly connected with the third ventricle, and it must be understood that there are certain morphological peculiarities in different mammals.

P. T. Herring⁵ has studied the histology, comparative anatomy, physiology, and development of the pituitary body.

PHYSIOLOGY.

Until quite recently very little was known definitely upon this subject.

The physiological functions of a structure such as the infundibular body are studied in two ways:

1. By injecting an extract of it into another animal.
2. By noting the effects produced by the removal of the whole, or a portion, of the structure under investigation.

In regard to the second point, it has been shown by Paulesco,⁶ Harvey Cushing,⁷ and others that total removal of the pituitary body from animals inevitably leads to death. Further, it has been shown that the removal of the anterior lobe, or of a portion of it, leads to genital infantilism—a condition almost invariably associated with destructive pituitary disease.

There is still much to be learnt, however; and as Dr. Hick and I are at present engaged upon work in connexion with the correlation of the ovaries and other ductless glands, I do not propose to anticipate, but pass on to the first point mentioned above—namely, the results of injection of the extract. In 1895 Oliver and Schäfer⁴ found that an extract made from the pituitary body—that is, from both the anterior and posterior lobes together—caused a rise in blood pressure, but they considered that the action

was not so powerful as that of the adrenal extract, the properties of which they had previously discovered. Subsequently Howell⁸ found that it was the extract of the posterior (infundibular) portion which possessed this property, and that an extract from the anterior portion (hypophysis) alone did not raise the blood pressure. This was subsequently confirmed by Schäfer and Vincent.⁹ Schäfer and Magnus¹⁰ also discovered that the extract of the infundibular body increased the flow of urine by reason of a selective (vaso-dilator) action on the vessels of the kidney.

All that came out of these important experiments was that an extract of the pituitary body was put upon the market, in the form of a compressed powder, as a diuretic. As far as I can learn it was little used, if at all.

Three years ago it occurred to me, while working on the physiology of the female genital organs, to try, among other things, the influence of the extract of the infundibular body on uterine contractions. I wrote to Messrs. Burroughs, Wellcome, and Co. for a supply, and they very courteously put me in communication with Mr. H. H. Dale, who made for me a large quantity for intravenous injection. At the same time he informed me that he had already found that the infundibular extract caused uterine contractions. So that, although we independently presumed this property, he was the first to test it. His experiment illustrating the fact was, however, buried in a paper on ergot,¹¹ and no suggestion was made to use it clinically. The effect of the infundibular extract upon the uterus is, of course, a more or less natural corollary to Oliver and Schäfer's experiments on the blood pressure.

In the course of the numerous experiments carried out by Hick and myself, which have already been published,² we discovered a further property—namely, the action on intestinal muscle—which I shall mention directly.

EXPERIMENTAL AND CLINICAL RESULTS.

Having, then, satisfied myself as to the clinical possibilities of this preparation, after consultation in regard to dosage and other minor points with Mr. H. H. Dale, I asked Messrs. Burroughs, Wellcome, and Co. to supply me with the infundibular extract for clinical use. Except as a diuretic in the form of a compressed powder, to which I have alluded, no one appears to have used it previously.

I will mention in order some of the valuable properties of infundibular extract, and illustrate them from our experiments as well as by clinical records. There is no doubt, I think, that any one of these properties is sufficient to secure a permanent place in therapeutics for this much neglected portion of our anatomy.

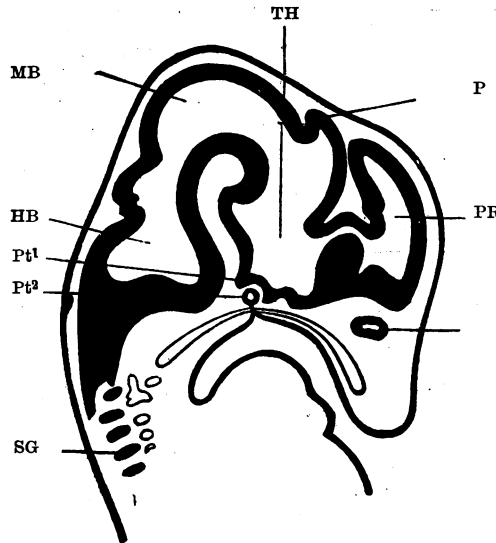


Fig. 4.—Vertical section through head of rat embryo. Showing the formation of the two parts of the pituitary body (diagrammatic). TH, Thalamencephalon. P, Pineal body. PR, Cerebral hemisphere. N, Part of nasal cavity. MB, Mid-brain. HB, Hind-brain. Pt¹, Cerebral part of pituitary body. Pt², Buccal part of pituitary body. SG, Spinal ganglion. (Young and Robinson, Cunningham's *Textbook of Anatomy*.)

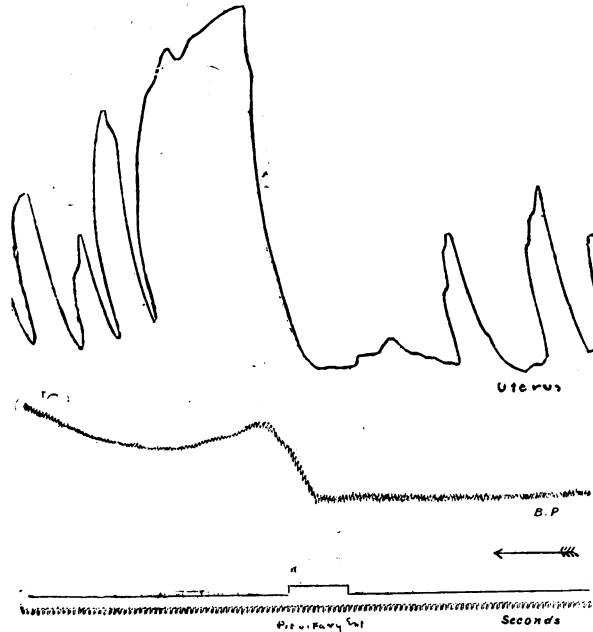


Fig. 5.—The effect of infundibular extract upon the blood pressure and pregnant uterus in the rabbit.

1. *Infundibular Extract Raises the Blood Pressure.*

This property, as already pointed out, was first discovered by Oliver and Schäfer,⁴ but they came to the conclusion that the infundibular extract was not so effective as adrenalin; this, however, is not the case. Infundibulin, if I may so call it, is remarkable in that it acts, as indeed other pressor substances sometimes do, in raising the blood pressure better when the animal or subject is in a condition of shock* than in normal circumstances. Most of our own experiments were carried out on pithed rabbits, in whom the blood pressure falls to a very low level. I look upon this as a most valuable collateral addition to its action: this raising of blood pressure in conditions of shock to a greater degree than is possible in more normal circumstances. (Fig. 5.)

Further, infundibulin keeps the blood pressure raised for several hours. This fact, too, can hardly be overestimated. We know how fleeting is the effect of adrenalin, and how useless, therefore, it is in cases of shock. In this new preparation, however, we have just the agent we need for the treatment of this condition.

In the case of a patient under the care of my colleague, Mr. Jeans, the blood pressure was raised and kept up for twelve hours. I am indebted to him and to his house-surgeon, Mr. Tinsley, for supplying me with a record of the case. I have myself used infundibular extract in cases of shock on several occasions. A good instance was the following case:

F. S. I removed a large fibromyomatous uterus which was densely adherent to the bowel and was fixed in the pelvis by adhesions due to coexisting suppurative appendicitis. After the operation, which was one of extreme difficulty, the patient was put back to bed with no pulse to be felt at the wrist; infundibular extract had been given before she left the table, and continuous subcutaneous salines were administered when she reached her bed. She made an excellent recovery.

I must emphatically point out here that this drug must in no way supersede, nor take the place of, saline infusions. It is used to raise the blood pressure for the time being, and in this way to save the patient during the critical period of vasomotor breakdown, a condition which salines cannot affect. I do not think the case just mentioned would have recovered on salines alone. On saline infusions, however, rests the responsibility of maintaining any improvement produced.

While our papers on the experimental results which we had obtained were in the hands of the editor of the BRITISH MEDICAL JOURNAL, Lockhart Mummery and Symes¹² published some experiments on the blood pressure in reference to shock, and concluded in regard to the extract of the infundibular body that our present knowledge of its properties and dosage was too incomplete to make it advisable to use it upon the human subject. I think, however, that the results that my colleagues and I have obtained at the Royal Infirmary will dispose of that view.

2. *Infundibular Extract causes Powerful Contractions in the Pregnant, Puerperal, and Menstruating Uterus.*

I have already said that it is somewhat natural to infer such an action in view of the effect infundibular extract has upon the blood vessels; at the same time, I would point out that most pressor substances have selective actions—adrenalin, for instance, acts more specifically upon the blood vessels than upon the uterus. Consequently, we were very glad to find that infundibular extract had a very special action on uterine muscle. Fig. 5 illustrates this effect upon the pregnant uterus of a rabbit.

When, therefore, I proceeded to use the extract clinically, my anticipations were speedily realized, for not only are the contractions in the human uterus made more powerful, but they are more prolonged than are those produced by any other preparation, not excluding the extremely active preparations of ergot now on the market.

Not a large number of serious cases have presented themselves. In normal labour I have used it with the desired results, but it is in the serious cases that one naturally looks for assistance. In two cases of Caesarean section I have had the opportunity of observing the naked-

eye effect of a single injection; it is immediate and convincing. The uterus contracts into a blanched "ball," and only relaxes subsequently to a moderate degree. Subinvolution of the uterus, due to defective contraction and retraction, is one of the dangers subsequent to a Caesarean section, especially if performed before the onset of labour; in such circumstances secretions and blood clots may be retained and become infected—a state of affairs favoured by any contraction of the pelvis which may be present, for this condition leads to the sagging forward of a subinvolved organ.

Then, too, there are those cases of sudden and serious haemorrhage which may occur before, during, or after labour. I supplied some infundibular extract to Dr. Hendry, the late obstetric assistant, with the request that he would give it an impartial trial. I cannot do better than append his report:

I used infundibular extract in two cases, and Dr. G. F. R. Smith used it in one other. In regard to the latter, which was a case of *post-partum* haemorrhage, Dr. Smith said to me on his return, "What do they need anything better than ergot for? the lot I injected acted like a charm." I knew, however, that there was no ergot in the bag, so I asked him to show me the box he got it from, whereupon he produced the infundibular extract.

In another case of *post-partum* haemorrhage, when I used it in conjunction with massage through abdominal walls, bleeding stopped in about three or four minutes.

The following are brief notes of the third case—one of placenta praevia—in which this preparation was used:

C. S., aged 29, 4-para. Her second and third deliveries were complicated by adherent placentae and membranes. In the present pregnancy bleeding began during the eighth month.

A severe haemorrhage—five pints of blood clot were recovered from the "chamber"—occurred on July 23rd, 1908. On my arrival the active bleeding had ceased, but the uterus was quite flaccid and no pains were occurring. The os uteri admitted three fingers, and the placenta was felt to be overlapping the uterine orifice, and extending 1 in. beyond the cervical margin.

The membranes were ruptured, version performed, a leg brought down, and infundibular extract injected. Two pints of saline solution were also infused intravenously. Pains came on about thirty minutes later without further haemorrhage. A second dose of the extract was then given, and the patient, whose condition had considerably improved, was removed to hospital. A dead child was born spontaneously three and three-quarter hours after the pains had recommenced—that is, four and a quarter hours after the first injection. Subsequent contractions and retraction were good, and the patient made an excellent, but slow, recovery.

There is little doubt that this preparation acts on the atonic uterus as well as, if not better than, it does upon the contracting organ, just as it does upon the blood vessels in conditions of shock.

I am inclined to think, therefore, that in the future we shall rely on infundibular extract to produce contractions of the uterus in many serious obstetric complications and difficulties, although I should, perhaps, add that in my opinion it ought but rarely to be given before delivery. I have for some time carried it in my obstetric bag, and would not willingly be without it.

3. *Infundibular Extract Acts upon the Intestinal Muscle.*

During our experiments on pithed rabbits we observed that violent peristaltic movements were generally set up in the intestines. On more than one occasion this led to

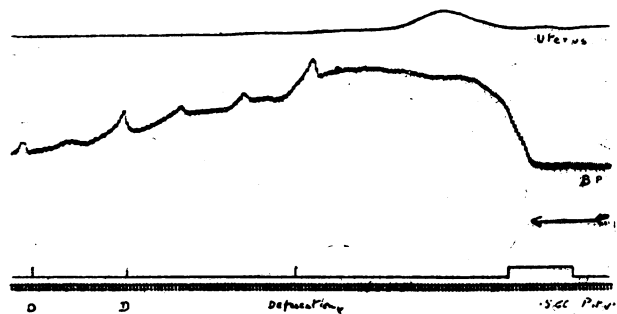


Fig. 6.—The effect of infundibular extract upon the intestine—as shown by rises in the blood pressure during defaecation and intestinal movements in the rabbit.

the expulsion of faeces. Fig. 6 gives a very good illustration of the effect upon the blood pressure of these intestinal movements; and it shows how violent they must have been to cause such rises in the general blood pressure.

* "Shock" is, of course, essentially a condition due to lowered blood pressure.

With our eyes always open to the possibility of practical and clinical results, it at once occurred to us that specific results upon paralysed and distended intestine might be obtained.

It requires no pen picture of mine to remind surgeons whose duty it is to invade the peritoneal cavity of the terrible battles that are often waged against this dangerous and obstinate complication; nor obstetricians who have encountered the difficulties of pseudo-ileus after Caesarean section, or even after normal parturition. Most of us can recall vividly each case we have met with, for they are often indelibly impressed on our minds by the hopeless position in which we have been placed. I know there are some surgeons who will say that, if only these cases were treated early enough with calomel and turpentine enemata, there should be no difficulty. While that is, of course, sound and absolutely correct as advice, most of us know that the sequel is not always encouraging. Besides—in gynaecological work especially—an enema cannot always be safely given, owing to lacerations of or perforations in the rectum.

I would invite those, therefore, who cannot effect relief in any other way—if they be too sceptical to use it earlier—to give a trial to infundibular extract. I have now used this extract for intestinal paresis in a fair number of cases—fortunately with modern methods this complication is not so common as it used to be—and I have never known it to fail.

Again, let me point out that, as with the blood vessels and uterus, infundibular extract appears to act more definitely when there is considerable atony and paresis than in normal circumstances. Indeed, when the patient is not distended, and when peristalsis is normally present, an effect is not always observable; I do not say it is not present, but the result is not so obvious. This is no reason, however, why the extract should not be given early. It should be given as soon as the patient is becoming distended.

I do not propose to record my own cases, for independent evidence is of more value; but, as I have already said, I have personally never known it to fail. It is interesting also to note that in some of those cases in which I have given it to combat shock or collapse after a serious operation, flatus has been passed per rectum during the first twelve hours—a happy state of affairs which all will agree hardly ever occurs in ordinary circumstances. It happened in the case of shock I have already referred to.

I am much indebted to several of my surgical colleagues at the Royal Infirmary for having sufficient faith in my representations to test the extract in some serious cases of paralytic distension. As I think that the evidence of unbiased observers will probably be more convincing than my own, I append a few illustrative cases as recorded for me by their house-surgeons.

Mr. A. M. Roberts has sent me the following account of a very serious private case under the care of Mr. Paul.

T. S., aged 33.

July 1st, 1909. The patient had a very severe attack of vomiting and pain. He was then fairly well for a month, but very constipated, and had to take pills and glycerine enules.

July 30th. The bowels were well moved.

July 31st. No motion.

August 1st. Very slight motion.

August 2nd. No motion, although he had taken pills and used an enule. Some pain towards evening and a severe attack of retching. One ounce of castor oil given. This and a second dose were at once returned.

August 3rd. Admitted to the Royal Infirmary. Immediate operation—ileo-sigmoidostomy—was performed, an obstruction having been found in the transverse colon. Calomel (gr. ʒ) was given every two hours with no result; also glycerine by the rectum was equally ineffectual.

August 4th. Same treatment, with no result.

August 5th. Morphine (gr. ʒ) and calomel (gr. 6) were given, with no result. Subcutaneous saline infusions were also administered. The patient was vomiting continually, was distended, and in great pain.

Second Operation: Right lumbar colotomy; more calomel given, with no result.

August 6th. Absolute obstruction had now existed for five days. The patient was very bad. Vomiting was continuous, and he was in great pain from flatulence and distension. Calomel, aqua menth. pip. and cajuput oil and various other drugs were tried, with no relief. Towards midnight an injection of infundibular extract was given into the muscles of the forearm. Within four or five minutes a great quantity of flatus was passed by the colotomy wound, with instant relief. In an hour a second injection was given, and again within five minutes a liquid motion was passed by the colotomy wound.

August 7th. The bowels acted slightly, naturally, through the colotomy wound. Vomiting was much less. Towards evening the patient got distended again, and was in great pain. Another injection of infundibular extract was given, which produced, in less than five minutes, a profuse motion, and the passage of flatus both by the rectum and by the colotomy wound. There was instant relief.

August 8th. Much less vomiting. In the evening the flatulence returned, when a fourth injection of the infundibular extract was given, with a result similar to those already recorded.

August 9th and onwards. From this date the patient has improved steadily, and the bowels have given no further trouble.

Other Effects Noticed.—The pulse tension went up considerably for a few minutes after each injection, and the frequency was also raised 20 or 30 beats per minute. The patient became somewhat blanched and decidedly exhausted. The blanching lasted for two or three hours.

I have given this graphic report verbatim, but I would like to point out in regard to the last paragraph that no actual observations were taken, otherwise such conflicting statements as "the pulse tension went up considerably for a few minutes" while "the blanching lasted for two or three hours" would not have been made. Also the increased frequency of the pulse is mentioned but no note made of the subsequent slowing. Further, that a dying patient was "exhausted" appears to me to be a somewhat delicate inference!

I have only to add that the patient, a gentleman of great ability and occupying a high position in his profession, was convinced that he would have died without the infundibular extract—a belief that was, I think, shared by Mr. Paul. Not only was the relief following the passage of flatus great, but also the feeling of well-being and security that followed the first injection was, he said, past belief. Hearing that I had been concerned in what had been of so much assistance to him he sent for me to tell me this, and he added, "they say the 'stuff' made them nervous as I was so blanched, but all I can say is it made me feel jolly well, although I thought I was dying five minutes before"—a statement somewhat contradictory to the statement that the patient was "decidedly exhausted."

Mr. Tinsley has given me the following report of two cases under the care of Mr. Jeans:

CASE I.

August 23rd, 1909. K. W., aged 11. Admitted for acute appendicitis. Immediate operation; free fluid and pus evacuated. Fowler's position adopted, together with rectal salines, one pint every two hours. Subsequently continuous saline infusions into the thighs. Pulse rate 132; respirations 32.

Next morning the patient was slightly better. Pulse rate 116; respirations 24. Later in the day the patient became worse; the pulse rate rose to 160, and the respirations to 40. On the following day the patient was very ill and becoming much distended. Infundibular extract was administered at 5.15 p.m.; an evacuation of the bowels occurred in ten minutes.

Next morning the patient died suddenly. *Post-mortem* examination revealed pneumonia of the base of both lungs.

Effect of the infundibular extract on the blood pressure: The blood pressure rose steadily for twelve hours, and only subsided five hours before death. The temperature and pulse also continued to rise; not necessarily as the result of the extract, but more probably owing to the onset of pneumonia.

CASE II.

September 7th, 1909. J. D., aged 23. Admitted for appendicitis, with general peritonitis. Immediate operation. Free fluid in the peritoneal cavity. Fowler's position adopted, with rectal salines (1 pint every two hours). Temperature 99° F.; pulse-rate 160. General condition bad. Next day the patient was a little better. On September 9th there was some flatulence, but no great degree of distension.

Oil of cloves and physostigmine (ʒ gr.) were tried without effect. Infundibular extract was given at night; there was no immediate effect on the bowels, but the pulse rate dropped from 120 to 80 in six hours. Next morning the bowels acted well after an enema. The pulse rate was then 100, and the patient better.

On September 14th a residual abscess was found and opened, but patient died on the 16th.

In regard to this case, which I did not have the opportunity of seeing, it will have been noticed that there was no *immediate* effect on the bowels, as in the other cases. On discussing the matter with Mr. Tinsley, he agreed that there was no real intestinal paresis present; and indeed the bowels acted a few hours later. This bears out what I have already stated, that the worse the condition of atony, within limits of course, the greater and the more immediate the effect of the infundibular extract.

These are just three typical cases out of many in which similar results have been obtained. And as I know there

are other surgeons present to-night who, having heard of the value of the extract in our hands, have given it a trial, I shall be much interested in hearing further evidence in regard to it.*

I myself venture to think that in infundibular extract we have at last found a reliable agent for the treatment of paralytic distension of the bowel. If after an extended trial this prove to be the case, every surgeon's anxieties will be considerably lessened, to say nothing of the lives that will be saved. I have not as yet tried infundibular extract in post-operative acute gastric distension, but I should not be at all surprised to find that it would prove to be of real value in this very serious, if somewhat rare, condition.

4. Collateral Effects.

I now come to some collateral effects produced by the infundibular extract which are extremely important; and it is just these additional effects which put this preparation so far ahead of adrenalin, apart from its greater efficiency and more prolonged action on the involuntary muscle fibres, already discussed. I refer to its special action on the heart and kidneys. This extract, after a short initial increase in the frequency, slows the heart and causes more powerful contractions. This effect is still produced, though to a less degree, with the patient under the influence of atropine, which is the therapeutic equivalent to severance of the vagi. In similar circumstances adrenalin causes acceleration.

Again, while adrenalin causes a diminution in the secretion of the urine, infundibular extract has, as already mentioned, a marked diuretic effect which is of very great post-operative value.

Finally, I may say for the benefit of rhinologists, laryngologists, and oculists, that infundibular extract may prove to be even more effective than adrenalin in producing local anaemia. I do not wish to speak positively upon this point, having only conducted one or two experiments; but they seem to support this view.

I have no time to touch on the preserves of the general physician. I am sure, however, that before long there are many who will use it in asthma and many other conditions.

MODE OF ACTION, AND NATURE AND ORIGIN OF THE ACTIVE PRINCIPLE.

Without going too deeply into the subject, I may, perhaps, be allowed to say a few words as to the manner in which infundibular extract acts. There is little doubt that its chief effect is peripheral, for if we place a rabbit's isolated and active uterus in Ringer's solution the organ contracts violently on the addition of a small quantity of the extract.† I do not think that we have any evidence to show that infundibular extract acts on the "pressor centres"; but this is quite possible, and, if so, must be of special value in an exhausted or paretic condition of these controlling structures.

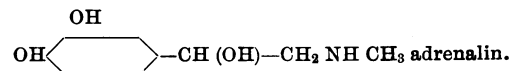
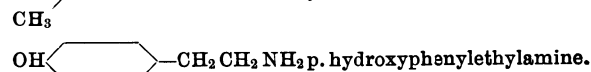
Probably it will not be long before the active principle is isolated, for much good work has been done on the subject of "pressor bases"‡ in the last few months. It may, therefore, not be without interest to recount, very briefly, the present position in regard to these compounds.

In 1906 Abelous¹³ showed that a rise in the blood pressure was produced when the extracts made from putrid meat were injected into the blood stream. This year Barger and Walpole¹⁴ published a paper in which they described the identification of the "pressor bases" concerned. These observers found that they were amines, namely, phenylethylamine, p. hydroxyphenylethylamine, and isoamylamine. There are one or two practical points arising from these chemical investigations. First, Rosenheim¹⁵ was able to show that the active principle of the placental extract of Dixon and Taylor,¹⁶ which was thought by them to be the cause of the normal uterine contractions in labour, was produced by incipient putrefaction in the placenta used, and contained the amines already mentioned.

Next, Barger and Dale,¹⁷ a few months ago, showed that the pressor properties of ergot are also due to these same bodies. Further, it is well known that these amines bear

a distinct relationship to adrenalin in regard to their structural formulae.

The following structural formulae are given by Dixon and Dale¹⁸:



It is important to bear these facts in mind, for there is in them a definite promise that in the near future the chemist will be able to synthesize the active principle of the infundibular body.

At present, however, we have to rely on an anatomical structure to provide us with it. So that it is interesting to know—or, perhaps, I should say conjecture—by what elements in the infundibular body the active principle is produced. In Fig. 3, representing a high-power view of the pituitary body, we see that in the infundibular portion, in addition to the nervous elements, there are islets of epithelial cells, as I have already described. It is probably these epithelial cells, and those of the pars intermedia, that are responsible for the pressor base; for it has already been shown by Osborne and Vincent¹⁹ that extracts made from ordinary nervous tissue—whether of grey and white matter mixed, or each separately—rarely have any effect on the blood pressure; but that if there be any, it is a depressor one.

Lastly, one word as to the preparation that I have used and its administration. Messrs. Burroughs, Wellcome, and Co. have just put the extract of the infundibular body on the market in "vaperole" flasks. Each flask contains 1 c.cm., which is the ordinary dose for an adult. The activity of the preparation is not destroyed by boiling, so that before being sent out each flask and its contents are sterilized in that way. The injections should be given intramuscularly to avoid superficial sloughing from the local vaso-constriction. The dose may be repeated with one hour's interval. After a few doses a short refractory period is established; but as to how long this lasts we have at present no accurate knowledge.

I hope, in conclusion, that I have not emphasized the properties of the infundibular extract too strongly; I have endeavoured not to do so, for I feel that there is no need, since this preparation is quite capable of producing its own effects in a sufficiently dramatic manner.

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DR. GOYDER, of Bradford, has been nominated for election as president of the Society of Medical Phonographers for the ensuing year. Sir William Gowers, retiring president, and Professor Sims Woodhead are nominated as vice-presidents. The December number of the *Phonographic Record*, edited by Dr. F. H. Spooner, contains a note in shorthand by the president-elect founded on the paper entitled "An Experiment in the Treatment of Epilepsy," published in the *BRITISH MEDICAL JOURNAL* last January. The honorary secretary of the society is Dr. Gruner, Pathological Department, General Infirmary, Leeds, who will supply full information as to the society. The annual subscription to members of the profession is 7s. 6d., and to students of medicine 5s.

* In the discussion that followed about a dozen other cases were recorded—one being a case of intestinal atony in splenic anaemia.

† I am indebted to Miss Sowton for performing this experiment for me.

‡ "Pressor bases" are those organic compounds which cause a rise in the blood pressure when injected into the blood stream.