The Pituitary Body and its Extracts in Pregnancy & Labour

by

G. J. Luyt.

M. D. 1916.
The Pituitary Body

The Pituitary Body, which derives its name from the ancient belief that it was a gland which discharged mucous from the nostrils, is present in all vertebrates. It is developed in man from an evagination of the buccopharyngeal ectoderm, called Rathke's pouch, which meets a simultaneous downgrowth of nervous tissue from the floor of the third ventricle. This downgrowth of nervous tissue forms the infundibular body or Pars Nervosa. The subsequent formation of the sphenoid bone obliterates all but the tip of Rathke's pouch and the lumen of this obliterated tip remains as a line of cleavage between the anterior and posterior portions. The anterior portion develops into a glandular structure, called the Pars Anterior, while the posterior portion develops into the Pars Intermedia, which applies itself to and partly envelopes the Pars Nervosa.
The Pars Intermedia, together with the Pars Nervosa, forms the posterior lobe and the Pars Anterior forms the anterior lobe of the pituitary body.

The whole becomes enveloped in an adherent dural capsule and occupies the Sella Turcica. The upper layer of this capsule is perforated by the infundibular stalk, connecting the pituitary body to the floor of the third ventricle.

**Histology:**

**Pars Anterior:**

The pars anterior, which is pinkish-gray in colour, is made up of columns of cells surrounded by large sinusoidal blood spaces. The cells consist of two types, styled according to their staining affinities, Chromophores and Chromophiles. The chromophiles are again divided into

1. Eosinophiles, which tend to line the sinuses and are most numerous near the centre of the pars anterior,

and 2. Cyanophiles or Basophiles, which occupy the periphery of the pars anterior.
Benda regards these cells as of the same type but in different stages of activity, the granules being the secretion of the cell and the number of granules its measure of activity. He thus recognizes

1. Young forms or Chromophobes
2. Active " " Eosinophile
3. Declining " " Granophile.

1. Pars Nervosa:—
The pars nervosa consists of a meshwork of neuroglial tissue, whose fibres radiate towards the infundibulum. In the interstices are hyaline bodies, which are very soluble and probably furnish the active principle of the posterior lobe.

2. Pars Intermedia:—
The pars intermedia is composed largely of neutrophilic cells without any connective tissue stroma. The cells invaginate the pars nervosa and tend to form acini containing a faintly acid staining, soluble, colloid substance, which appears
to discharge into the paraseptal area, where it has already been described as soluble hyaline bodies.

**Secretion:**

The pars anterior is a typical gland of internal secretion and discharges its secretion directly into the sinusoidal blood spaces. In the posterior lobe histology and experimental clamping of the stalk support Herring's view that the hyaline colloid bodies are a secretion of the pars intermedia and that they are discharged through the paraseptal area into the third ventricle. This view is further sustained by Cushing and Hocken, who claim that the cerebrospinal fluid contains a substance with all the properties of extracts of the posterior lobe.

Benda, however, regards the hyaline bodies as products of cellular degeneration, while Bell regards them as a means of storing secretion when there is no great demand for it.
Physiological Variations:—

1. Age:

At puberty there begins in the pars anterior a marked increase in the number of chromophil cells until at the fortieth year they equal the chromophobes in number. Then follows a decrease together with nuclear and protoplasmic changes, which are regarded by some as degenerative changes. This period of hyperplasia corresponds to the most active period of the genital organs. Cushing has reported numerous examples of sexual infantilism, the result of hypophyseal deficiency developing before puberty, and of amenorrhoea, impotence and genital atrophy due to hypophyseal deficiency developing after the attainment of adolescence. Experimentally similar results have been obtained after hypophysectomy in young and adult animals.

DeCypion noted that electrical stimulation of the hypophysis caused erections in
some animals and Cushing reports an abnormal sexual excitation in a number of animals after partial hypophysectomy, being probably the result of the sudden liberation and absorption of hypophysial secretions. Vecchera showed that castration was followed by hypophysial hypertrophy, and this was probably the cause of the special growth features of eunuchism. There is therefore little room for doubt that the pituitary body and the genital organs have a direct influence over one another, but the apparent influence of the pituitary body over the acquirement of secondary sex characteristics, as illustrated in cases of hypopituitarism, is indirect only, because Steinbach has definitely shown by ovariotomy and testicular transplantation, that the acquirement of the masculine characteristics is related to the testicle.

Pregnancy:—Erdeheim-Thomme have
shown from the examination of 150 pituitary glands of pregnant women that (1) The colour changes from greyish-
red to white,
(2) The size & weight increase,
(3) In Multiparae the average weight is 61.8 grammes and the maximum 75 c.g.,
(4) In Primiparae the average weight is 84.7 c.g. and the maximum 110 c.g.,
(5) In Multiparae the average weight is 106 c.g. and the maximum 165 c.g.,
(6) Histologically there is a marked increase in the pars anterior of large
neutrophilie cells, apparently derived from the normal chromophobe cells. These
arrange themselves in zonules around the vascular spaces and crowd out the
eosinophilie cells, which become markedly decreased in number. After parturition
involution takes place and the pregnancy
cells return to the ordinary small
chromophobe type and the eosinophile
regain their former predominance,
but the involution is gradual and
only ends with the termination of lactation.
Ciullo found in rabbits and guinea pigs that involution was never complete and that the effect of successive pregnancies was cumulative, so that the pituitary body became very large in pluri-paræ.

Cushing corroborates the findings of Erdheim & Shamme and in the canine gland he has noted a marked hyperplasia in the pars intermedia as well.

Briefly the histological variations of the pituitary body in different physiological conditions are:

Birth to Puberty — Chromophobes in excess

Puberty — 40 years — Chromophils increasing

At 40 years — Chromophils equal the chromophobes in number

After 40 years — Chromophils degenerating

Pregnancy — Chromophobe hyperplasia

In pathological conditions Benda, Lewis & Fischer found that eosinophiles adenomas indicated increased functional activity and Cushing in 26 cases of hypopituitarism found that the pituitary body had undergone a chromophobe hyperplasia.
It appears therefore that the chromophile preponderate at the periods when the pituitary gland and also the sex organs are active, while chromophobe preponderance synchronizes with pituitary and sexual inactivity.

Mackenzie found that, though the pituitary glands of lactating cats were enlarged as compared with those of non-lactating cats, there was no indication of greater activity of their extracts.

It is doubtful therefore whether the enlarged pituitary body of pregnancy is one of over- or under-activity. The pituitary body of pregnancy however differs from other states of chromophile hyperplasia in that the cells are of a specially large variety. Pregnancy was apparently the exciting cause in three of Cushings cases of pituitary disease. Two of these were acromegalies and one was a case of hypopituitarism.

Bell considers that when the demand for secretion is great, secretion (growth) does not accumulate in the cells and eosinophilia does not occur.
Pituitary Extract

Extracts of the pars anterior have not been found to produce any noteworthy effect when injected, except a thermic reaction in cases of hypopituitarism (Cushing).

With intravenous injection of extracts of the whole gland or of the posterior lobe only, the following conclusions have been arrived at:

1. A slight inaugural fall of blood pressure is produced by a depressor substance soluble in alcohol (Schäfer Vincent) but is followed by a long continued rise due to peripheral vascular constriction (Oliver Schäfer) and to augmentation in force & slowing of the heart-beat (Howell). A second injection if administered soon after the first has no effect on the blood pressure (Howell).

2. The renal arteries are exempt from peripheral constriction and on the contrary they dilate (Magnus & Schäfer), which together with a specific stimulation of the renal epithelium (Schäfer Herring) causes
a marked diuresis.

3. The action is directly on the vessel walls (Davidi & Carraro) and directly on the heart-muscle or the heart ganglia, because section of the vagi does not inhibit the augmentation and slowing of the heart (Howell).

4. It produces contraction of the uterine (Dale), the intestinal and the vesical muscles (Bell & Hich).

5. It is a powerful mammary stimulant during lactation (Ott, Scott, Dieter, Mackenzie).

6. If frequently repeated it leads to emaciation (Carrano & Crow, Aoching, Homan), to hepatic necrosis (Carrano) and to atrophomalous changes in the aorta (Baduel).

7. It alters mineral metabolism and leads to a deficit of calcium, magnesium & phosphorus. In the circulating blood it causes an increase of calcium & magnesium (Franchin).

8. It causes increased sensitiveness of the uterus to touch (Fages, Hofstraeter), to paracitic stimulation (Hochcast & Frittkich) and to the action of ergot (Henzberg).
Extracts of the Posterior Part of the Pituitary Body in Obstetrics

Although Dale pointed out the action of pituitary extract on the uterus in 1906, Blair Bell was the first to introduce it into practical obstetrics by using it in a case of post-partum haemorrhage in 1909. Since that date it has been applied to various obstetrical conditions, and these will be considered separately after recording the cases in which I have used pituitary extract.

Cases.

Inertia:—

No. 1. Mrs. P. de W., aged 31, 1 para, 03 half dilated, position L.O.A. In labour 16 hours, pains fairly strong but of short duration and as practically no progress was being made ½ c.c. pituitary extract was injected. 10 minutes later uterine contractions became stronger and longer but progress was still very slow, and after an hour the effect of the injection passed off. A second injection...
was not administered because there was some rigidity of the cervix and perineum. The os dilated fully 9 hours later and delivery was effected with low forceps under chloroform. A perineal laceration of the second degree was sutured. The 3rd stage lasted 15 minutes. The uterus was badly contracted but became hard 3 minutes after an injection of ½ c.c. pituitary extract. On the 2nd day after parturition the fundus was one third down from the umbilicus to the pubis and on the 10th day it was on a level with the pubis. Lactation commenced on the 12th day and continued throughout the nursing period.

No. 2. Mrs. A. L., aged 29, 4 para, OS the size of a crown, position L.O.A. In labour 20 hours, pains fair but abdomen pendulous. A binder and ½ hour delay showed no progress, so ½ c.c. pituitary extract was injected. Strong contractions of a rhythmic character followed in 5 minutes and continued until delivery ½ hours later. The 3rd stage lasted 20 minutes. The puerperium was not
visited, but I found on inquiry, that lactation commenced on the 3rd day and was well maintained. This patient's previous confinements were all instrumental (forceps)

No. 3. Mrs. J., aged 29, opera, 08 the size of a crown, vertex presentation. In labour 9½ hours. Hydramnios & head not engaged. Pains almost continuous but very short and weak. I punctured the membranes high up and allowed the liquor amni on to escape slowly. The foetal head came down in the L.O.T. position but did not engage the cervix well, so ½ c.c. pituiary extract was injected. In 3 minutes a strong contraction commenced and continued with only partial remissions for 15 minutes, when a highly asphyxiated dead child was born. 3rd stage 15 minutes. After pains followed immediately and continued for 2 days. On the 2nd lactation commenced and on the 3rd day the breasts were like solid tumours in spite of tight bandaging. On the 5th day the fundus was halfway down from the umbilicus to the pubis, and on the 7th day it was no longer palpable.
Mrs. K., aged 24, 1st para, 0 3/4 to 3/4th dilated, position L.O.A., in labour 11 hours, pains frequent but not strong. An injection of 5 c.c. of pituitary extract was followed in 5 minutes by a moderate increase in the strength of the uterine contractions. After continuing rhythmically for 50 minutes they diminished in intensity. 1 1/2 hours after the injection the 0 3/4th was dilated and 2 hours later forceps were applied for slowing of the foetal heart. Cervix and perineum were both rigid and latter was lacerated to the 2nd degree. The 3rd stage lasted 20 minutes. On the 4th day the fundus was still at the umbilicus, and after a 1/2 c.c. injection of pituitary extract it was one inch below the umbilicus on the 5th day, but after 3 weeks it was still above the level of the pubis. Imperfect escape of the lochia from the vagina, caused by too tight suturing, was probably the cause of the subinvolution. Lactation commenced on the 3rd day and the mother continued nursing the child for 18 months (against advice).
No. 5. Mrs. A., aged 28, 4 para, OS 3 fingers, membranes ruptured, position L.O.A., in labour 8½ hours, pains too weak to make head engage the OS. An injection of ½ c.c. pituitary extract was followed in 2 minutes by a strong contraction, which continued without remission for 3 minutes, when a slightly asphyxiated child was born. The 3rd stage lasted 35 minutes. Severe afterpains followed immediately, and, together with frequency of micturition, continued for 30 hours. The fundus, which was just below the umbilicus after the 3rd stage, was ½ way to the pubis on the 4th day and on a level with it on the 10th day. Lactation commenced on the 2nd day and the breasts were hard and knotty on the 3rd day. Four weeks later lactation was arrested on account of the death of the child from whooping cough. This patient has since had a rapid normal labour without pituitary extract.

No. 6. Mrs. B., aged 35, 3 para, OS ½ dilated, position L.O.A., in labour 6 hours, pains frequent but of short duration. An hour
later practically no progress had been made, so ½ c.c. pituitary extract was in-
jected and this was followed in 3 minutes by a strong contraction, which continued
with incomplete remissions for 12 minutes, when delivery of a slightly asphyxiated
child took place. 3rd stage 30 minutes. The puerperium was not attended, but I
was told that lactation commenced on or about the 3rd day and was well
maintained.

No. 4. Mrs. de Kock, aged 32, 2pm. Five years previously I did a ventral suspension
for retroversion of the uterus. During the 8th month of pregnancy there was con-
tinuous pain, and, since the cervix was getting displaced upwards and backwards,
I tried to induce labour 3 weeks before
term, first by Krause's method and then
by a de Rotsch bag which burst in situ.
Both attempts failed and the bag set up
an anaemorrhage and vaginal discharge.
Labour began a week later and after
being in progress for 9 hours the os
was ½ dilated and the position, as I
thought, L.O.A. On account of a rise of temperature to 100° and pulse to 96 and slow progress with weakening pains, I injected 1 c.c. pituitary extract. In 3 minutes a strong contraction resulted, which lasted 5 minutes, and was followed at very short intervals by other strong contractions. The membranes ruptured after 15 minutes and delivery took place as an occipito-posterior 20 minutes after the injection. The child was rather blue but breathed readily. 3rd stage 10 minutes. Nine hours later the temperature was 101.6, the pulse 108 and the patient complained of headache, shivering & sweating. In the hope of ensuring firm contraction and as diminishing absorption from the uterus ½ c.c. pituitary extract was injected and the vagina douched hourly. After a week the temperature and pulse were normal and on the 10th day the fundus was two-thirds down from the umbilicus to the pubis. In spite of the sepis lactation commenced on the 3rd day.
and remained good throughout the nursing period.

No. 8. Mrs S., aged 30, 1 para, 03 ½ dilated, position L.O.A., in labour 14½ hours, pains of short duration and no progress for 2 hours. ½ c.c. pituitary extract was then injected and 5 minutes later the contractions became stronger and of longer duration but retained their rhythmic character. In 20 minutes the head was on the perineum, but on account of slight rigidity and large size of the foetal head forceps were applied under chloroform one hour after the injection. A perineal tear of the 2nd degree was sutured. Slight sepsis of the perineum followed through unskilled nursing. Involution was slow and with ergot medication only reached the level of the pubes on the 16th day. Lactation commenced on the 3rd day and continued without interruption.

No. 9. Mrs V., aged 29, 1 para, OS size of half- crown, position L.O.A., in labour 12 hours, pains too weak to make the presenting part engage the cervix thoroughly. ¾ c.c.
pituitary extract was injected; in 2 minutes a contraction commenced and, after continuing uninterrupted for 7 minutes chloroform was administered to arrest it. The os was then dilated, and, the chloroform having been discontinued, strong contractions followed again at short intervals, but the mother became hysterical so chloroform was started again and forceps applied 30 minutes after the injection. No perineal tear. 2nd stage 10 minutes. After-pains began at once and continued for 18 hours, although the placenta and membranes were quite complete and the patient a primipara. The fundus was midway between the umbilicus and pubis on the 5th day and just above the level of the pubis on the 10th day. Lactation commenced on the 2nd day and the breasts were engorged on the 3rd day. Five months later lactation was stopped on account of maternal pulmonary tuberculosis.

No. 10. M's delli, aged 32, 2 para, 08 dilated, position occipito-anterior (vertex), weak pains and delay on the perineum. An injection of
½ c.c. pituitary extract caused a strong contraction in 3 minutes. It became rhythmically stronger and weaker but there was never an interval of complete relaxation, and after 20 minutes a slightly asphyxiated child was delivered. 3rd Stage 20 minutes. The fundus was halfway to the pubis on the 5th day and on a level with it on the 13th day. Lactation commenced on the 3rd day and continued without interruption.

No. 11. Mrs R., aged 34, 5 para. 83 dilated, L.O.A.

Chloroform was administered during the 2nd stage pains, but after an hour and a half they became very feeble and the intervals so long that the mother went to sleep, so ½ c.c. pituitary extract was injected. 10 minutes later the pains became strong, but remained perfectly rhythmical and delivery resulted 20 minutes after the injection. 3rd Stage 10 minutes. The nurse reported slight haemorrhage ½ hour later, which was arrested by an injection of ½ c.c. ergotin. The fundus was halfway to the pubis on the 5th day and just above it on the 10th day. Lactation commenced on the 3rd day and was excessive.
No 12. M. S., aged 27, 2 para, position L.O.A.,
08 dilated. Delay at the outlet because pains
were too weak to effect delivery and
the mother would not or could not
bear down. An injection of ½ c.c. pituitary
extract was followed in 5 minutes by
a strong uterine contraction, which be-
came weaker rhythmically but never
relaxed completely. The mother screamed
instead of bearing down and labour did
not progress. After 15 minutes the foetal
heart became inaudible and labour was
terminated with forceps under chloroform.
The child was small & pale, the cord pul-
ated 80 per minute and breathing was
only induced after 15 minutes artificial
respiration. The placenta was expressed
from the vagina 30 minutes after delivery,
and was accompanied by an excessive
quantity of blood, and was followed by
slight haemorrhage, which was almost
immediately arrested by an injection of
½ c.c. pituitary extract. The puerperium
was not attended and I have not seen
the patient since (5 weeks).
Abortions:

No. 13. Mrs. C., aged 42, 3 para, 2 months incomplete abortion with 08 dilated. An injection of ½ c.c. pituitary extract produced no noticeable effect.

No. 14. Mrs. H., aged 34, 2 para, 2½ months incomplete abortion with 08 dilated. Four minutes after the injection of ½ c.c. pituitary extract the patient complained of very severe pains and 10 minutes later the membranes were expelled. Very severe pains continued for several hours, during which time pieces of decidua were expelled. Haemorrhage and pains then ceased, but great frequency of micturition continued until the next day. Thereafter recovery was uneventful.

No. 15. Mrs. S., aged 32, 3 para, 2 months pregnant. 4 grains B.W.'s tablet pituitary gland were taken 3 times a day for 2 days and caused diarrhoea. A subcutaneous injection of 1 c.c. pituitary extract on the 3rd day caused within a few minutes pallor and faintness and very slight pains in the back and above the pubes. The
pallor & faintness passed off in 10 minutes and the pains died away in half an hour without any effect on the uterine contents.

No. 16. M. M., aged 32, 3 para, 10 weeks incomplete abortion, 03 partially dilated and slight pains present. An injection of ½ c.c. pituitary extract had no effect, and a second injection of ½ c.c. an hour later was followed within 5 minutes by an unexpected movement of the bowels but without any noticeable effect on the uterus.

Induction:

No. 17. M. T., aged 34, 6 para, position L.O.A., 8 months pregnant, with pyelitis necessitating induction of labour. By Krause's method slight pains were induced but the bougie slipped past the vaginal tampon & escaped and the pains died away 6 hours later. 08 then admitted 2 fingers and the membranes were intact. ½ c.c. pituitary extract was injected; strong pains followed in 2 minutes and continued with normal rhythm until delivery took place 2½ hours later.
3rd stage 15 minutes. Severe after-pains began at once as after previous confinements. The fundus was 2 fingers below the umbilicus after the 3rd stage and on a level with the pubis on the 8th day. Lactation commenced on the 4th day and for the first time continued throughout the nursing period.

No. 18. Mrs. T., aged 38, 4 para, 88 2 fingers, position L.O.A. Patient had a show 10 hours before but no perceptible pains. Since I had to attend another patient twenty miles away, I injected ½ c.c. pituitary extract. 14 minutes later a pain began and was followed rhythmically by other strong pains. The membranes ruptured half an hour afterwards and the 03 was dilated in an hour. The pains then became shorter in duration and the intervals correspondingly longer but remained sufficiently strong to effect delivery 1 hour 21 minutes after the injection was made. 3rd stage 20 minutes.

For no apparent reason involution was slow and the fundus reached the level of the pubis at the end of the 3rd week only. Lactation commenced on the 3rd day but
the quantity of milk secreted was less than after previous confinements and became deficient 2 months later.

11.19. Mrs. R., aged 30, 3 para, position L.O.A.

19 days before term the membranes ruptured. The external os then admitted 2 fingers and the internal os one finger. For 2 days the condition remained the same and no pains were felt. ½ c.c. pituitary extract was then injected. 4 minutes later the uterine became hard and the patient said something was pushing up. Slight pains in the hypogastric region were then felt, and after recurring regularly for an hour they began to diminish and 1½ minutes later they practically ceased. A second injection of ½ c.c. pituitary extract again produced hypogastric pains, which lasted for 2 hours, and a third injection reproduced them again. Half an hour later vomiting occurred, and immediately afterwards the pains became strong and like normal labour pains in character. In 2 hours (10.5½ hours after the 1st injection) the os was dilated and then
chloroform was administered during the pains, but the patient insisted on forceps
and was thus delivered. 3rd stage 15 minutes.
Small haemorrhages occurred repeatedly
and so 1/2 c.c. pituitary extract was injected
with a good result. (This patient had a
very severe post-partum haemorrhage in
her previous confinement, which I could
arrest only by plugging the uterine).
On the 3rd day the fundus was halfway
down to the pubis and on the 18th day
it was one inch above the level of the
pubis, but involution was interfered with
by obstinate constipation. Lactation
commenced on the 2nd day and is
still continuing well (7 months).

Placenta Praevia:

No. 20. Mrs. D., aged 20, 1 para, 8 months preg-


nant. Patient had been bleeding for 9½


hours, was very pale and had a very

soft pulse of 132. Very feeble pains occurred

at long intervals and with each pain

there was still slight haemorrhage. The

03 was the size of a crown, the membranes

intact, the presentation vertex and the
placenta palpable at the margin of the 0s. The foetal heart was not audible and no foetal movements had been felt for many hours. I ruptured the membranes at once and injected ½ c.c. pituitary extract. Five minutes later a strong contraction began, which made the foetal head engage the 0s and all haemorrhage ceased. This pain continued with rhythmic but incomplete remissions for 25 minutes, when a small dead child was delivered. The 3rd stage lasted 10 minutes and left the uterus hard with the funiculus inch below the umbilicus. After-pains were present for 4½ hours. On the 3rd day the fundus was halfway to the pubis and level with it on the 10th day. Lactation commenced on the 2nd day but was arrested by bandaging and belladonna plasters.

Post-partum Haemorrhage & Atony:—

No. 21. Mrs. de T., aged 30, I para. When the 0s was half-dilated an injection of scopolamine Morphia compound was injected. Unexpectedly labour at once progressed rapidly and delivery, half an hour later, was followed
by severe haemorrhage. Expression of the placenta and douching failed to stop it, but the uterus reacted in 3 minutes to an injection of 1 cc. pituitary extract and the haemorrhage ceased. 3 days later the fundus was halfway to the pubis and lactation had commenced; it continued uninterruptedly.

No. 22. M.B., aged 39, 1 para. A normal labour of 8 hours was followed by severe haemorrhage. Expression of the placenta was unsuccessful and it was removed manually. Haemorrhage still continued and douching failed, but it stopped a few minutes after the injection of 1 cc. pituitary extract. Ergot was administered for a few days. On the 3rd day the fundus was halfway to the pubis and level with it on the 7th day. A perineal tear of the 2nd degree healed badly and a month later the uterus was found retroverted. Lactation commenced on the 3rd day and was very free, but had to be stopped on account of the anaemia of the mother.

No. 23. M.K., aged 27, 1 para, normal labour
terminated by low forceps for perineal rigidity. Small perineal laceration. After the 3rd stage the uterus was soft and badly contracted but there was no haemorrhage. It became hard 3 minutes after an injection of ½ c.c. pituitary extract. The perineum united well. The fundus was halfway to the pubis on the 3rd day and level with it on the 7th day. Lactation commenced on the 3rd day and was well maintained. One month later I examined for a complaint of backache and found the uterus retroverted.

No. 24. M. M., aged 30, 1 para, normal labour with chloroform during a second stage of 2 hours. A fairly large piece of chorion was retained and the uterus not well contracted, so I injected ½ c.c. pituitary extract. The puerperium was uneventful; the fundus was halfway to the pubis on the 5th day and nearly level with it on the 10th day. Six weeks later the uterus was normal in size and position. Lactation commenced on the 3rd day but became deficient after 3 months.

Eclampsia:

No. 25. M. M., aged 35, 4 para, 5½ months pregnant
Had three eclamptic fits and urine loaded with albumen. Since the pulse tension was very high I injected 1 c.c. Veratrum (P.D. & Co.). The pulse rate soon fell in tension and from 90 to 54; the patient vomited and then became maniacal for an hour. Eighteen hours later the pulse rate and blood pressure became high again but were again reduced by an injection of 1/2 c.c. veratrum. For four days the blood pressure was controlled by hot peeks and purgation but then it rose again, fits threatened and another 1/2 c.c. veratrum was injected. During the succeeding two days the quantity of urine increased to 30 ounces a day, the oedema diminished and very slight uterine contractions took place. Labour, however, made no progress and the pulse rate rose steadily to 132, so I injected 1/2 c.c. pituitary extract. Strong rhythmic pains began 2 minutes later and continued regularly for 2 1/2 hours, when a macerated foetus was delivered. An hour later the placenta was removed manually but with great difficulty, because the os was contracted to admit two fingers only and
the body of the uterus was balloonied, so that the fingers could not reach the fundus. After drawing the uterus another ½ c.c. pituitary extract was injected on account of collapse. After pains were present in unusual severity for 2 days. The urine was free from albumen in 24 hours and the recovery was uninterrupted.

**During the 3rd Stage:**

**No. 26. Mrs. W., aged 26, 2 para, normal labour terminated by low forceps on account of inefficient bearing down due to a pendulous abdomen. During the 3rd stage, with the patient not yet recovered from the anaesthetic, the uterus relaxed and bled. An injection of ½ c.c. pituitary extract had no noticeable effect and the placenta was removed manually. The fundus was quarter way down from the umbilicus to the pubis after the 3rd stage, halfway on the 3rd day and just above the pubis on the 10th day. Lactation commenced on the 2nd day & was well maintained. In this case the nurse passed a catheter once the same evening but the necessity was very doubtful.**
The Mode of Administration:—

Hofbauer & Bubis, who have used pituitary extract from stock bottles, are agreed, that it deteriorates when kept in bulk and becomes unreliable in its effects. They advise the use of 1/2 dramme vials and a large variety of makes is now on the market, but I used only Borrough's Welcome & Co's Vapordex Infusion. Hofbauer asserts that alcohol must not be used for sterilising the syringe, because it interferes with the action of pituitary extract, and Cahn attributes most of his failures to this cause, but Watson took no such precautions and saw no bad results. I sterilised my syringe by heat and inserted the needle through a drop of lye placed on the skin.

The following methods of administration have been used:

1. By the mouth:

Foges & Hofstetter found that no effect was produced on the urine or blood pressure. In case 15 4 grains of B. W. & Co's pituitary gland tablet were
taken 3 times a day for 2 days and the only result was diarrhoea.

2. By Subcutaneous Injection:

This was the method I used throughout and the only systemic effect noted was in Case 15 and consisted of pallor and faintness which lasted 10 mins. Heaney observed the effects in 19 personal cases and concluded that, provided a blood-vessel was not punctured, subcutaneous injection produced no appreciable change in the pulse rate or blood pressure and no general disturbance or local effects; but hardening of the stomach was felt in every case where the stomach was palpable.

In 191 cases by different authors, who definitely stated that the injection was subcutaneous, uterine contractions became markedly stronger in 180 or 94.2%. In 4 or 2.09% no effect was produced and in 7 or 3.6% the effect was so slight as to be practically failures, but these 7 cases were all reported by Cohn and attributed by him to the use of alcohol for sterilising
his syringe, and he claims better results since using saline. If these are omitted the successful results rise to 97.8% and the failures to 2.1%.

In my 15 cases, in which pains were present at the time of the injection, augmentation was obtained in all. The shortest duration of the effect without delivery was 50 minutes (Case 4).

The time which elapsed between the injection and the first resultant contraction, varies according to different observers from 2 to 10 minutes. The limits in my cases were 2 and 14 minutes with an average of 4.3 minutes.

3. By Intramuscular Injection:

Heaney observed in 5 out of 11 puerperal cases a rise of blood pressure of 8 to 12 mm, which appeared within 5 minutes and passed off within 15 minutes. In the remaining six cases there were no unusual variations.

None of the eleven was any unpleasant symptom produced, and in all, where the uterus was palpable, it was felt to harden
after the injection. In obstetrical cases
Humpatone reports a rise of blood pressure
of 8 to 20 mm.
Bubis reports 150, Edgar 70, Handley 60,
Humpatone 64 and Quigley 25 cases, in
which intramuscular injection caused
no unpleasant local or general symptoms.
It takes effect on the uterus within 10
minutes (Watson), in 2 to 15 minutes (Quigley)
5 to 15 minutes (Hirsch) and the effect lasts
30 minutes (Edgar), 60 to 90 minutes (Watson)
and 90 minutes (Quigley).

4. By Intravenous Injection:—

Heaney injected 8 cases during the peripartum. In
one it was doubtful whether the needle
entered the vein. The remaining seven
within a minute became bloodless, queer
and dizzy but these sensations lasted
in no case longer than 3 minutes. The
blood pressure rose to its maximum
within 3 minutes and the rise varied from
26 to 58 mm. The pulse-rate synchronously
fell 16 to 48 beats per minute. Both
blood pressure and pulse rate returned to
normal again in 10 to 45 minutes. In each case the uterus gave evidence of marked contraction.

Hofbauer found in rabbits that intravenous injection caused dyspnoea, slowing of the pulse, hypertension, while Beech & Plumier in 11 out of 19 cases reported such effects as pallor, vertigo, syncope, cephalalgia, oppression, colic and a desire to defecate, which lasted from 5 to 40 minutes.

Hofbauer used intravenous injection in obstetrics with very rapid and powerful action on the uterus but sometimes with unpleasant symptoms, such as, pallor, cyanosis, perspiration and oppression.

5. By injection into the uterine muscle:

Schmid obtained good results in 5 cases: one by passing the needle through the abdominal wall, one during Caesarean section and one by passing a long needle through the cervix into the uterine muscle. In one of these a previous subcutaneous injection had failed to produce any effect.
Dosage:

In my first two cases I used a dose of 1 c.c. for post-partum haemorrhage. In the second one (No. 2) involution was so rapid that I thought the subsequent retroversion might have been due to an unequal involution of the uterus and its ligaments. I then used ½ c.c. doses, but found in the majority of intra-partum injections, that the uterine contractions were unnecessarily severe and frequently nearly continuous e.g. Cases 3, 5, 6, 7, 10. In 4 cases I then used ¼ c.c. injections, and in three of these the resultant uterine contractions much more closely resembled normal uterine action, but in the fourth (No. 9) they were still excessive when no pains were present at the time of the injection, or when they were very feeble, as in Nos. 17, 18, 19 ½ c.c. injections did not produce too violent reactions.

Bubis found, that 1 c.c. injections produced contractions which were too continuous and the death of the foetus in two of his cases.
He then began using 2 to 4 minims doses and obtained good results in 150 cases. The majority use doses of 5 to 2 c.c. with an average of about 1 c.c., while Humpstone and Edgar use 4 c.c. but without any apparent advantage.

If the first dose is without effect Watson-Hofbauer inject again in 10 minutes, Humpstone in 20, Edgar in 30 minutes, but according to the rate of action of pituitary extract a delay of 20 minutes seems quite ample.

If the initial effect is slight an increase may follow gradually, for example, Case 19 half an hour after the injection, while in Herz's case of uterine rupture a tetanic contraction took place one hour after the injection.

When the effect of one dose passes off another injection will again augment the pains e.g. Case 19.

Although ezmeteration, hepatic necrosis & atheromatous changes have been reported as resulting from repeated injections, Hofbauer regards the use of pituitary extract
in obstetrics as non-poisonous. Humpstone in 10 cases of induction injected 4 c.c. three daily for 3 days, Bab in a case poisoned, injected 2 c.c. daily for a month and Johnson in a case of induction 1 c.c. hourly for ten hours without any perceptible ill-effect.

Inertia

Of over 1200 cases, which I found reported in the literature available to me here in South Africa, only 557 were reported in sufficient detail to make the following analysis. Such an analysis is, however, not to be relied upon, because while one man calls the augmentation of pains a success if they advance labour to an easy forceps position, another is not satisfied until he has pushed the injection to take the place of forceps. Thus Hendley in 56 cases used forceps once and those for contracted pelvis, while Babis in 150 cases used forceps 26 times. The latter reported no ill-effects, and the former had one fetal death.
three post-partum haemorrhages.

No. of cases in which pituitary ext. was injected 557
- - - - - pain was augmented 547 or 98% 
- - - - - delivery was effected 468 or 84%
- - - - - forceps were necessary 66 or 11.8%
- - - - - labour was not advanced 23 or 4.1%

In my 12 cases uterine contractions became stronger in all but in two (163: 1 x 4) so slightly that labour was not materially advanced. In both there was rigidity of the cervix and so second injections were not used. In 3 (2 primi- parae) of the remaining 10 cases low forceps were applied: one for foetal distress the result of the injection (16. 12), one on account of the hysterical condition of the mother (16. 9) and the third for rigidity of the perineum and large foetal head (16. 8). The remaining 7 cases were all multiparae and were delivered on an average 26 minutes after the injection. In one of these (16. 3) the foetus was fatally compressed by a semicontinuous contraction of 15 minutes duration.

My results therefore were better in the
multiparae than in the primiparae. Duckley, Welz, Rosland, Hendley and Offner had 7 failures in 67 primiparae or 10.4% and 2 failures in 85 multiparae or 2.3%. The majority of reports agree that the best results are obtained with pituitary extract in the second stage of labour, but I did not have an opportunity of using it, except for delay at the outlet, and in these I consider forceps safer. Hufbauer considers pituitary extract unsuitable, when the uterus is almost retracted over the foetus and abdominal pressure is wanting; Case 1612 was probably an example of this kind.

**Induction of Labour**

1. During the first 3 months:— This group includes induction as well as abortions already in progress. Frumkaun, Hall, Abelsheim, Fries, and Schiffmann state that pituitary extract is unreliable & practically useless during the 1st 3 months.
Stern, Hirsch, Humphry, Hale, Neer, Schäfer, Hamm, Watson & Patek: between them they have reported 45 cases, of which only 9 or 20% were successful. Hamm reports spasm of the internal os in one case.

I used pituitary extract in 4 cases and obtained no effect on the uterus in 3. In the fourth (No. 14) strong pains followed on injection 8 1/2 c.c. and the uterus was successfully emptied.

2. During the second 3 months:—

Veyssiere, Schäfer, Hamm, Rieck, Rowland, Watson & Daurier between them have reported 9 cases with 3 successes or 33%. Hamm and Rieck experienced spasm of the internal os in their cases (three). Case No. 26 was quite successful at 5 1/2 months after pains were already present, but the third stage was complicated by contraction of the os and ballooning of the body of the uterus.

3. Premature Labour:

Fabre & Patek, Grunbaum, Benthic & Hall found
pituitary extract unsatisfactory and unreliable for the induction of premature labour.

Poullet, Neussie, Stern, Hirsch, Fries, Madill & Allan, Watson, Herzberg, Geobel, Hofbauer and Vogt have reported 27 cases with 14 successes or 52%.

When used in conjunction with bags or bougies good results were obtained by Stern, Bubis and Madill & Allan. In one such case (No. 19) where the pains, induced by Krause's method, were passing off it acted admirably and led to a successful termination of labour at 8 months.

4. Full term & Overterm:

When used alone as a means of inducing labour conflicting results have been obtained. Thus Fries, Johnson, Herzberg, Krakamer, Watson, Stolper, Hagan, & Schifmann report 16 successful inductions with doses varying from 2 injections of 10 minims each to 10 injections of 1 cc each, while Humphreys reports 10 consecutive failures, each of which received
an injection of 4 c.c. 3 times daily for 3 days, Rowland succeeded in inducing pains in 3 cases, but they lasted only for a few hours after each of two 1 c.c. injections and labour did not follow.

Edgar holds that pituitary extract is successful only, when contractions are already present, though these may be imperceptible to both attendant & patient. This agrees with the fact that the drug is generally successful when used in conjunction with suction or dilators; or when some sign of impending labour, such as, a show or premature rupture of the membranes, is present, though no labour pains have been perceived. Five such successful cases are reported by Pouillet Vayssieres, Hirsch, Reek and Kroemer, while I had two which both succeeded. In case No. 18 an injection of ½ c.c. 10 hours after the show induced labour in 14 minutes. In case No. 19 the membranes had been ruptured two days (17 days before term) and labour was induced by 3 injections of ½ c.c. each at intervals of ½ x 2 hours.
Placenta Praevia

Hirsch, Trapl, Bell, Cahni, Pall, Watson, Vogt, Quigley, Fischer & Studenty have reported 48 cases with 45 good results or 93.7%.

In Trapl and Pall's 25 cases there was no maternal death and of the 20 children alive before the injection of pituitary extract 19 were born alive.

Trapl advises the following procedure:

1. Placenta marginal or lateral—rupture the membranes and inject pituitary extract.

2. Placenta central—D. version and then inject.

3. O.S. small—Insert hydrostatic dilator and then inject pituitary extract.

In case No. 20 in which the O.S. was the size of a crown, the membranes intact, the vertex presenting and the placenta marginal I obtained an excellent result by rupturing the membranes and injecting ½ c.c. pituitary extract. The child was dead before the injection was made.

Accidental Haemorrhage

Jardine reports 2 cases and Johnston one.
of concealed accidental haemorrhage, each of which successfully reacted to an injection of pituitary extract.

In a case of external accidental haemorrhage Clavier successfully administered pituitary extract after packing the cervix and vagina.

Post-partum Haemorrhage

Pituitary extract as a cause:

It has been experienced by many users of pituitary extract that post-partum atony and haemorrhage are liable to follow an intra-partum injection, if delivery is delayed an hour or more. For this reason Jæger advises a prophylactic injection just before birth, and Skene uses a prophylactic injection of Seca coron. Among 478 cases, in which the reports stated the absence or presence of haemorrhage, there were 20 cases of post-partum haemorrhage i.e. 4.1%, but some of the statements were indirect only and it is probable
that some minor haemorrhages were ignored or not attributed to pituitary extract, when one considers the disparity between some authors' results.

Fortunately an injection of pituitary extract increases the sensitiveness of the uterus to touch (Fages & Hofstätter) and to the action of ergot (Herzberg), and so a resultant haemorrhage is more easily controlled. In cases 11, 12 and 19 slight haemorrhages occurred 1½, 1½ and 2 hours respectively after the injection; one was arrested by ergot and two by second injections of pituitary (2×19).

Pituitary extract as a remedy:—

Humpel and Abelheim consider pituitary extract unsuitable for post-partum use, because it causes intermittent contractions. Madill and Allan overcame this difficulty by using it in combination with ergot and obtained good results.

Fages & Hofstätter, with pituitary extract alone in 63 cases, claim results superior to those obtained with ergot. Barnes also reports favourably and of 44 cases
by different observers two or 4.8% were failures. Against these results Edgar had 13 failures in 19 cases, but the disparity is so great, that one suspects a cause other than pituitary extract to account for the number of failures. In two cases (No. 21 & 22) of post-partum haemorrhage, following non-pituitary labours, I obtained rapid and permanent arrest of haemorrhage with an injection of 1 c.c. Two cases (No. 23 & 24) of post-partum atony, following pituitary free labours, reacted at once to ½ c.c. injections.

Eclampsia

Humphreys, Malinowsky and others consider nephritis and a blood pressure of 145 or more contraindications to the use of pituitary extract through fear of causing a further rise of blood pressure, but Klotz reports, that the increase in blood pressure in time and amount is only marked in cases with an initial low blood pressure and is very slight.
in cases with a normal blood pressure. Rowland reports a case with a blood pressure of 155, in which headache followed 5 minutes and a convolution 15 minutes after the injection; immediate forceps delivery ended in an uneventful recovery. In another case of Rowland's the blood pressure was 150 and no ill effect followed the injection, while the blood pressure fell a little.

Kroemer, Stern, Antechi & Zahrzewski and Fries report 5 more successful cases. In case 25 I reduced the blood pressure by means of veratromine injections and hotpacks, and then successfully used pituitary extract in a 1/2 c.c. dose. This case had three convulsions in quick succession before the veratromine was injected.

_The Third Stage_

Quigley and Madill Allen found that intra-uterine injections of pituitary extract caused shortening of the 3rd stage.
The average duration of the 3rd stage in Penney's 25 cases was 17\tfrac{3}{5} minutes. In the 15 cases of which I have records, the average was 13\tfrac{5}{6} minutes. These do not include Case 16 25 in which the placenta was retained, because it was a 52 months eclamptic with a macerated foetus.
In Case 16 26 I injected pituitary extract during the 3rd stage for haemorrhage, while the patient was still under chloroform, and no effect was produced.

Puerperium

After-pains:

Excluding the 3 abortion cases, pituitary extract was injected in 23 and of these 6 (No. 3, 5, 9, 17, 20, 25) had after-pains of unusual severity, which continued in the two primiparæ for 45 and 13 hours and in the multiparæ for 30 to 48 hours. In each case the placenta and membranes were quite complete. In all the induced labour pains were strong and maintained their intensity.
until (until) delivery. Two (No. 3-17) gave previous histories of similar afterpains, but in the remaining 4 or 17.3% they can be attributed to the pituitary extract only.

Of the 5 cases, who had post-partum injections only, none experienced afterpains. Schmid mentions the presence of afterpains in 25% of his cases, but Benzó in 77 cases observed very few afterpains and when present, they lasted only 10-14 hours. Most reports make no special mention of afterpains.

Urination:
Two (No. 19-14) of my 26 cases had frequency of micturition and it lasted for 30 and 24 hours. Each had an intrapartum injection only.

Case No. 26, in which the injection had no effect, was once catheterized by the nurse; the remaining cases all passed urine naturally, and reports are unanimous on the rarity of post-partum retention of urine after pituitary labours.

As a means of overcoming retention Berk...
concludes, that an intramuscular injection will affect emptying of the bladder if it be full, otherwise the diuretic effect takes place first and the bladder stimulation is delayed. Possibly this accounts for the fact, that, while 8 Jasnke in 47 cases successfully induced menstruation in 80%, Frang in 12 cases failed in 75%.

**Lactation:**

Of the 22 cases, of which I have records, one was a 3½ months miscarriage and showed no mammary reaction. In 14 cases (63%) lactation commenced on the 3rd day; 11 of these nursed the full period, in 2 lactation became deficient after 2½ months and one was obliged to stop nursing on account ill-health.

In 6 cases (27%) lactation commenced on the 2nd day and the breasts were engorged on the 3rd day; three nursed throughout, one had to stop on account of pulmonary tuberculosis and two on account of death of the children.

In the remaining case, an induction at 8 months, lactation commenced on the 4th day.
and continued for the first time (6 p.m.) throughout the nursing period.
In comparison with normal cases I think pituitary extract causes the breasts
to fill up more rapidly, and whether the action be muscular or secretory, it is
a stimulus to lactation.
Gavin found in lactating cows that intravenous injections were followed
by an increased collection of milk in the lower portions of the udder, but the
quality and quantity of milk per diem were not altered. Schaper obtained a
similar result in the human subject, but Reynolds reports the establishment of
mammary secretion after its absence for some time in 4 cases, two of which,
however, did not continue long.
Heaney failed to demonstrate any
galactogogue effect in mothers, who had
had stillbirths and the mammary
secretion was passing off, and also in
mothers with a deficient mammary secretion.
By means of a hyperaemia bell, with an
upright glass column and the whole filled
with water and applied to the breast, he demonstrated a decrease in the size of the breast after injections of pituitary extract, and concluded from this, the ejection of milk from the nipple and the corrugation of the areola, that he was dealing with contraction of the smooth muscle fibres of the breast and not with an increase in the secretion of milk. Hammond after a long series of injections in lactating goats concludes, that the action of pituitary extract on the breast is secretory, but I think his results may equally well be interpreted in favour of muscular action and a consequent more complete emptying of the udder, because he invariably obtained an immediate increase with a subsequent fall in the quantity of milk as compared with normal milkings; for example, a morning injection caused an increase in the morning supply and a fall in the evening supply. Simpson Hill concludes that the action is secretory because barium salts
act on involuntary muscle fibre and yet produce no galactagogue effect.

**Involution:**

Of the 17 cases, which were full-term or nearly so and in which records were kept, the fundus was at or nearly at the umbilicus after the third stage in all. In 7 it was halfway to the pubis on the 3rd day after labour; of these 4 had post-partum injections only, 1 had intra- and post-partum injections and 2 had intra-partum injections only, with an average interval of 20 minutes between the injection and delivery.

In 12 cases the fundus was halfway to the pubis on or before the 5th day; of these 5 had post-partum injections only, 1 had intra- and post-partum injections and 6 had intra-partum injections only, with an average interval of 21 minutes between the injection and delivery.

In 3 cases the fundus was on a level with the pubis on the 7th day; two of these had post-partum injections and one an intra-
parturient injection 15 minutes before delivery. In two of these (Nos. 22 and 23) the uteri became retroverted subsequently and this might have been predisposed to by a possible more rapid involution of the uteri than of its ligaments.

In case 17, which was premature and in which the fundus after labour was two fingers breadth below the umbilicus, it reached the level of the pubis on the 8th day, the interval between the injection and delivery was 2½ hours.

In 9 cases the fundus was at or less than 1 inch above the pubis on the 10th day. Four had post-partum injections and 5 intra-partum injections only, with an average interval of 2½ minutes between the last injection and delivery.

In case 8 the fundus reached the pubis on the 14th day and it had an injection of 1 c.c. one hour before delivery.

In cases 4 and 18 the pubis was not reached until the end of the 3rd week and they had an intra-partum injection each, 4 and 1½ hours hours before delivery.
Case y, which had one injection 20 minutes before delivery, was sepulchre and the fundus was one-third above the pubis on the 10th day. According to Eden and Palabin the fundus ought to be halfway to the pubis on the 7th day and level with it on the 14th day and according to Hauthain and Jellett these levels ought to be reached on the 7th + 10th days respectively.

My observations in these 17 cases are:

- Halfway to the pubis on the 3rd day - 7 or 41%.
- " " " by the 5th - 12 or 70%.
- Level with the pubis before the 10th day - 4 or 23%.
- " " " by the 13th - 13 or 76%.

It appears therefore that a post-partum injection or an intra-partum injection, which is soon followed by delivery, decidedly accelerates involution during the first 3 to 5 days but thereafter the effect is less marked. This is more or less in agreement with Humphreys's statement, that involution is more rapid when pituitary extract is injected during the latter part of labour.
Ill-effects.

1. Palor and faintness of brief duration were experienced once in my 26 cases after subcutaneous injection. These general effects have already been considered under mode of administration (pages 36-37).

2. Violent uterine contraction:—

The first contraction, which results from pituitary extract, is often of long duration and sometimes practically continuous. E.g. Hamm reports one of 17 minutes duration and in case 9 the first pain continued without the slightest remission for 7 minutes and was then checked by the administration of chloroform, while in cases 3, 5, 6, 7, 10, 12, 20 the initial contraction never completely relaxed but only became weaker and stronger alternately.

Babits experienced these severe contractions and 2 fetal deaths after 1 c.c. in the cases doses, but never since using 2-4 minutes Edgar, who uses 4 c.c. doses, reports...
premature separation of the placenta, fetal compression of the fetus and uterine rupture as a result of these violent contractions and attributed them to injection early in the first stage. Malincowski also attributed them to injection early in the first stage, but only when there is distension of the bladder or rigidity of the cervix. In a case of uterine rupture following tetanic contraction, Körösi attributes the rupture to rigidity and backward displacement of the cervix, causing anterior distension of the lower uterine segment. Körösi & Ardwick remark on the frequent occurrence of tonic contractions and report two resultant uterine ruptures, but they admit that in one there was a rigid undilatable cervix and the uterine obstruction.

They, as well as Edgar, wisely insist on the readiness of chloroform before injecting pituitary extract.

3. Spasm of the internal os:—

Cases have been
reported by Hamm, Rick, Heil, Nagy, Bubis and others and Case 25 was evidently one of this kind. Spasm of the OS is, however, a rare complication. Post-partum Atony and Haemorrhage:

These have already been considered (pages 47 and 48).

5. Effects on Foetus:

Prolonged contractions cause asphyxia and slowing of the foetal heart, which are generally considered to be not dangerous. In case 12 the foetal pulse immediately after birth was 80 per minute. Fetal compression sometimes results, as in Case 3.

Other effects such as contraction of the extremities (St. Ancheh and Sahwegst), spasm of the glottis (Hamm) and malaeus (Fries) cannot be attributed directly to the pituitary extract.

Summary:

1. Pituitary extract is a drug which powerfully strengthens uterine contractions.
during labour and therefore its true indication is uterine inertia.

2. Subcutaneous injection is the safest method of administration, because it causes no systemic effect. Intramuscular injection is equally satisfactory except that it may cause a slight rise of blood pressure. A positive result may be expected from either within 2 to 15 minutes after injection and in over 90% of cases, and the effect lasts about an hour.

3. Intravenous injection is unsuitable for routine use on account of the circulatory disturbance it causes.

4. If no effect is produced by the first injection, a second, and if necessary a third, may be administered at intervals of 20 minutes.

5. The usual dose is ½ c.c. or more often causes excessive uterine action and the results obtained with ¼ c.c. doses resemble normal uterine action far more closely.

6. The intensity of its action is very
uncertain and cannot be predicted in any given case. It is, however, generally more marked in multiparae than in primiparae; when there has been uterine distension, such as hydramnios, and when the membranes are ruptured.

7. Its effect increases proportionately with the advance of pregnancy and still further with the advance of labour.

8. It is unsatisfactory in abortion cases and is unreliable for the induction of labour at any time; unless some sign of impending labour, such as a show is present or it is used in conjunction with other means, such as, bougies or dilators.

9. It is contraindicated when there is disproportionate obstruction. In cases of slight obstruction, and rigidity or displacement of the cervix, pituitary extract must be used in a small dose, such as, 1/8 or less, in order to test the individual susceptibility first, and may then be repeated if necessary, since its action is not cumulative.
10. Chloroform must be in readiness in all cases to control the contractions if prolonged and dangerous.

11. It is a useful adjunct in Puerperal Periuria, rupture of the membranes, version or dilators, and it holds out more hopeful prospects to the general practitioner at least, in the treatment of concealed accidental haemorrhage.

12. It may be used in Eclampsia by subcutaneous injection, and if the blood pressure is high, in conjunction with veratrine.

13. Post partum Fommy & Haemorrhage are liable to follow the injection of pituitary extract, if delivery is delayed an hour or more, but in such cases the uterus recurs readily to another injection and also to ergot.

14. In Post partum Haemorrhage its action is rapid but it is best used in combination with ergot.

15. It acts as a stimulant to lactation, but apparently has no true galactagogue action.
16. Post-partum injections and injections producing delivery within half an hour markedly accelerate involution during the first 3 to 5 days at least.
17. It facilitates post-partum urination and consequently retention of urine is rare after pituitary labours.
18. Finally pituitary extract is at the same time the most valuable and the most dangerous drug in obstetric use, and has no place in labour, when uterine contractions are of normal strength and duration.

References:

   " " " Mar. 29 1913 p. 655.
15. Eberle—Universal Medical Record 1913 Vol. iv p. 163
31. Haudtman—Practical Handbook of Midwifery
45. Jellett—Short Practice of Midwifery
B. M. J. Mar. 22 1913 p. 607.