day to day the variations in the amount of indican are considerable.

(b) In patients without thyrotoxicosis there may be no indican present in the urine, or on similar diet there may be much indican.

(c) Goitre cases without thyrotoxicosis show no difference in the form of indican curve from that in toxic cases.

(d) Toxic cases show concentrations which do not vary inversely as the degree of intoxication. Some well-marked exophthalmic cases have much indican, some non-toxic cases little or no indican.

The foregoing results do not lend support to the view that thyrotoxicosis is dependent upon increased tryptophane absorption from the intestine, as advanced in 1923 by Mr. D. J. Harries.¹ It was at one time thought that thyroxine was derived from tryptophane, Professors Kendall and Osterberg regarding it as trihydro-tri-iodo-oxyindole propionic acid.² Dr. C. R. Harington,³ however, has since shown that it is derived from tyrosine, from which he has synthesized it as a diphenyl ether.

Further experiments were therefore undertaken to discover whether the absorption of unchanged tyrosine would result in thyrotoxicosis. Owing to the relative insolubility of tyrosine only small amounts could be injected intravenously, and, moreover, these experiments were limited to three volunteers. It is admitted that more experiments are desirable, but in the three performed there was no increase in the pulse rate following the injection, and no apparent effect on metabolism, as would be expected if thyroid activity depended upon the amount of unchanged aromatic amino-acids reaching the thyroid.

COMMENTARY AND CONCLUSIONS.

It would appear, in the first place, that urinary indican varies in amount from day to day both in normal people and in those suffering from various diseases, sometimes being absent in health, at other times highly concentrated, tending more often to reach high concentrations in men, and to be absent from the urine of women; secondly, in exophthalmic and other varieties of toxic goitre there is no constancy in the concentration of urinary indican, which may be absent or present in varying degree; and thirdly, the variations are independent of the degree of thyroid activity.

The urinary indican appears, therefore, to be of no value in determining whether a case of thyrotoxicosis is progressing or decreasing, and so enabling the surgeon to decide when to operate.

Owing to the general similarity in structure of the molecules of thyroxine and adrenaline with that of tyrosine, and the fact that tyrosine is one of the essential amino-acids, it is reasonable to suppose that the hormones of the thyroid and suprarenal glands are ultimately derived from the tyrosine part of the ingested protein; but there is no evidence to show that the activity of these glands depends upon the amount of tyrosine available at any one moment from the alimentary tract, and without doubt the problem of the pathogenesis of thyrotoxicosis is more complex than merely a question of supply and demand, in which the supply is probably at all times very much greater than the demands made upon it.

SUMMARY.

1. Using a standard technique, colorimetric estimations of the concentration of urinary indican as indigotin were carried out for (a) healthy subjects, (b) non-thyrotoxic cases, and (c) cases of thyrotoxicosis.

2. Graphs (indicanuria curves) were made. There were no outstanding differences in the curves from each of these groups.

3. The urine of women is more often free from indican than is that of men. Higher concentrations of indican occur more frequently in men.

4. The concentration of urinary indican bears no constant relationship to the degree of thyrotoxicosis.

5. The hypothesis which ascribes thyrotoxicosis to an increased absorption of unchanged aromatic amino-acids from the intestine is not confirmed.

6. The statement that in all cases of well-established exophthalmic goitre there is no indican in the urine is not borne out. Several well-established cases gave high readings.

7. Three volunteers were injected intravenously with small quantities of tyrosine. There was no effect on their pulse rates.

8. The active principles of both thyroid and suprarenal are probably derived from tyrosine, but there is no evidence to show that the amount of these principles depends at any one moment on the quantity of tyrosine available from the alimentary tract.

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This research was carried out in the wards and laboratories of the Surgical Unit of the Welsh National School of Medicine, under the direction of Professor A. W. Sheen.

PAINLESS LABOURS:

THEIR OCCURRENCE, THEIR INTERPRETATION, AND THEIR ADOPTION AS A STANDARD.

BY

MARY DeGARIS, M.D., B.S.MELB.,
GEELONG, VICTORIA.

PAINLESS labours are exceptional in occurrence, and are commonly regarded as being very rare, puzzling, and incomprehensible. A series was published in the *British Medical Journal* in 1906, and additional instances have been reported in previous issues of this year.

Reference to case reports and to the literature makes clear that such labours are commonly associated with uneventful recoveries and vigorous infants, with laceration rare and slight; the labours are often primiparous, and successive labours are usually painless also. The desirability of comfortable pregnancies, easy labours, and uneventful recoveries is undeniable, and it is surely worth while trying to explain their occurrence.

Before proceeding to a comparison of the painless with the usual form of labour it is necessary to mention certain features of average labour, all of which may be demonstrated in an analysis of a small series of cases. For instance, there is a great variation in the length of the first and second stages in different women, and also in the amount of suffering accompanying them; there is a definite rise in the forceps rate with the increasing duration of the first stage; and a short first stage tends to be followed by a short second stage, while a long first stage may be succeeded by a short, medium, or tedious second stage. The second stage is not uncommonly more endurable than the first stage, while its duration varies from two or three minutes to as many or more hours. The febrile puerperium is often related to an albuminuric or pyelitis pregnancy, as is also the prematurity and stillbirth rates.

The common symptoms of average labour are pain during the uterine contraction, sense of effort, sense of advance, sense of impending defaecation, bearing down, vomiting, cramps, and not uncommonly fatigue; these common symptoms vary from patient to patient, not all are present in every one, while the intensity of the pain may be trivial, moderate, extreme, or intolerable.

The first three of the cases recorded here demonstrate that the painless labour resembles the average labour in every respect except in the absence of the pain during the uterine contraction. The signs are just the same—"show," flow of waters, dilatation of os vagina and perineum, the "crowning," the delivery of infant and placenta, and the varying duration of the individual stages of labour. The characteristic symptoms are also the same—sense of pressure, sense of something to be expelled, sense of advance, sense of impending defaecation, strange feelings, and bearing down. In many painless or nearly painless labours the mother is the only one aware of the imminence of delivery; pain is so common that neither doctor nor nurse may pay sufficient heed to the mother's sensations, indicative as they are.

Is the absence of pain sufficient to brand such a labour as abnormal? It may be unusual, but it is not

pathological. Ought we not to argue from it that pain is not a necessity to successful childbirth, and to seek rather the cause of the pain than of its absence? In this way it might become possible to bring the pangs of labour under a real control through ability to deal with their causes, rather than merely by the palliation of anaesthetics. There is certainly nothing in the so-called definition of normal labour to contradict the suggestion that the natural painless labour is a normal labour. If it is a normal labour, should it not be adopted as the standard of normal labour?²

Some deny the possibility of painless labour in a healthy woman, and attribute the absence of pain to hysteria, myelitis, tabes, or other disease of the nervous system; others admit the existence of painless labours in healthy women, but regard them as inexplicable. One author places birth with one pain under the heading of pathological labour; another states that some pain is nearly always present, even though it may be slight. Nearly all authorities show a great reluctance to abandon the idea that pain is a necessity to healthy labour.

After revising all the available case reports and references of painless labour, and after actually witnessing one such delivery, and then comparing them with the ordinary case, I find that all labours may be arranged in a gradation, passing from the painless and nearly painless labour to the severe, the complicated, and the obstructed labour. The symptoms and signs are the same, though they vary in intensity from case to case—the same variation is true of all clinical conditions.

Painless labours fall into two main groups: (1) The pathologic painless labour, where the woman is ill—for example, tabetic, myelitic, toxæmic, etc. (2) The normal painless labour, occurring in the healthy woman: (a) the labour resembling defaecation—the type labour; (b) the sleeping labour (Dr. Percy Allan describes these two in his article); (c) the painless labour requiring forceps delivery. An example of this is given in my case reports (Case 8), and several are in the literature. I have heard of others, but without details.

What interpretation may be placed on pain in labour, both as regards its presence and its absence?

All will agree that pain is a symptom; most will accept Mackenzie's statement that it is a viscerosensory reflex occurring during labour. No one will deny that it is dependent on the uterine contraction—it comes on with the contraction, increases with it, and dies away with it; indeed, No contraction, no pain! though not No pain, no contraction. It is a reflex indication of the uterine contraction; anything that interferes with the reflex arc, such as diseases of the nervous system, will interfere with the sensation of pain. Body poisons, as in toxæmias, may have the same effect; thus we can explain pathological painless labours. In some women there is no viscerosensory reflex (pain), but there is a visceromotor reflex (vaginismus). Vaginismus also occurs not uncommonly in the average labour. In all varieties of labour this reflex may detain the head and hinder rotation, and necessitates forceps. This is the explanation of the painless labour requiring forceps, at least where impatience of the accoucheur can be excluded (see Case 8).

There are pains other than labour pains due to muscular contraction, but they occur only when the muscular action is abnormal or inefficient. In angina pectoris and the various colics the pain is a distinct indication of inefficiency; in them, also, visceromotor reflexes as well as viscerosensory reflexes may occur. The uterus is a hollow muscular organ designed first to retain and then to expel its contents, just as are the heart, the bowel, the bladder, and other hollow viscera. The physiology of all these must be very similar. The uterine contraction is not always painful. It is frequent during pregnancy and after labour, and probably also during menstruation; it is generally painless, but when painful gives rise to "false pains," after-pains, and dysmenorrhœas. The patient with false pains is very likely to have a tedious labour, especially a tedious first stage, and after-pains—that is, to have some inertia.³

Since the uterine contraction is painless in some conditions, and in rare painless labours, is it not possible

that pain in labour is a borderline symptom of uterine inertia, and an indication of some defect in the contracting muscle—that labour is a crisis which discovers any fault in the uterine health? Dysmenorrhœas are commonly due to errors in the general health, so probably are dystocias. Since symptoms precede signs in most clinical conditions, the symptom of inefficiency (pain) may be present long before there is any sign (delay), as, indeed, we see every day. Child-bearing is so complicated a process that faults may occur singly or in battalions, and these errors may concern the mother, the infant, or the process of labour.

Painless labour, with spontaneous delivery, in a healthy woman (see Cases 6 and 7), being the best and easiest labour known, should be taken as the standard or normal labour. Its adoption would give us an absolute, concrete, and physiological standard of labour—namely, that a normal labour is one in which the uterine contractions act thoroughly efficiently, leading in a short time to the spontaneous delivery of a healthy infant, and causing little or no pain or suffering to the mother.^{1 4}

We imply by this definition that the normal uterine contraction is efficient and painless, and it becomes possible to study uterine action by the reflexes produced and the work done⁵; this work is shown by the amount of dilatation of the os, and by the advance of the presenting part; the reflexes produced may be viscerosensory (pain), visceromotor (bearing down and vaginismus), and organic (vomiting and dyspnoea). The chief reason for the lack of progress in midwifery has been the absence of a definite standard of uterine efficiency; the painless efficient labour supplies this.

CASE REPORTS.

My Case.

CASE 1.—A primipara, aged 20, engaged me at the sixth month. She had quickened at four and a half months; there had been no sickness, and she felt very well. She had had measles twice, but no other illnesses. The menses began at the age of 13; they were regular every four weeks, lasting four days, and there was never any pain therewith. She has some false teeth, no crowns or pivots, and she has never had any fillings. She was remarkably well during pregnancy, and took a mixed diet with a great deal of fruit, vegetables, and milk. Labour was a fortnight later than expected. Labour started at 11.10 p.m. with "pains" in the back, occurring every twenty minutes, perhaps oftener; there was no distress. At 10.30 a.m. the patient was having "pains" every ten minutes; the os was fully dilated and the membranes were intact. I ruptured the membranes, which were visible, during a "pain," the head being well down in the pelvic cavity. The patient complained only of a sense of pressure, not of pain; but she had had actual pain up to 10 a.m., felt first low in front, and then later in the back. This pain was evidently very slight. She vomited three times during the night. I stayed with her till the child was born; each pain did obvious work and was accompanied by a slight bearing down. The advance was slower than I anticipated from my first examination. At 1.32 p.m. a vigorous female child weighing 9 lb. was born, with very little caput. The mother complained of some pain with the last two contractions, due, I think, to perineal laceration; when questioned later she denied that she had felt any pain when the infant was born, but said it was an "awful" feeling when the head crowned, immediately after which the perineal tear began. Some blood came out beside the head during the last three or four pains. Later she told me that there was actual pain in the first stage, and during labour she had had a weakness in the back, perhaps an ache. In the second stage there was only a feeling as if the bowel was about to act, without real pain. She did not feel the tear, and she did not like the feeling of distension of the vulva by the head when it was fixed, but it was not real pain. Her temperature rose to 99.6° F. the first night. Her puerperium was otherwise quite uneventful, and she nursed her baby successfully. Involution was good.

Dr. Winifred Kennon's Case (Melbourne).

CASE 2.—A primipara, aged 24, commenced her labour about 4 a.m. with some slight discomfort and sensation of abdominal uneasiness. Sixteen hours later there had been a "show," but she was in no distress; the presentation was left occipito-anterior, the os was slightly dilated, and the membranes were intact. At 11 p.m. she was bearing down slightly and the membranes were beginning to appear. She had no pain, and only felt she had something to push out. The membranes were ruptured artificially, and at 12.30 a.m. the child was born. Dr. Kennon reports: "The patient could not understand when I told her to push when she got a pain, because she did not have any pain, but if I told her when she got the bearing-down feeling to push she understood and delivered herself in that way." There was a small tear necessitating one suture. Involution was normal, but she could not feed her baby very well. Her diet during pregnancy was practically an ordinary mixed diet, with the meat reduced in amount; she was particularly fond of fruit. Her upper teeth are artificial, and she had no fillings.

Dr. Yeatman's Case (South Australia).

CASE 3.—A primipara, aged 26, nine months pregnant, alone in the house after breakfast, felt some discomfort and thought the bowels were going to act, but, recollecting her condition, got into bed just in time for a healthy full-term infant to be born. When seen, two hours later, the child, attached to a perfect placenta, was in the bed; the perineum was not torn. The patient did well until the third day, when a rigor occurred and the temperature rose to 103° F. The uterus was explored and douched, but nothing was found. The next day she was very ill, and further examination revealed a badly decayed and foul-smelling molar tooth, which was extracted at once. The puerperal sepsis gradually cleared up, and she was convalescent in about a fortnight. In this case no vaginal examination could possibly have been made, and no local treatment was given after extracting the tooth. She persisted in the statement that there was no pain at all, merely a sensation as if passing a large motion.

Dr. Joyce's Cases (West Australia).

CASE 4.—In this case Dr. Joyce was sitting reading, and the patient said in a perfectly natural voice that something was coming, and birth followed immediately. She admitted a slight pain or two.

CASE 5.—This patient, a primipara, while the head was crossing the perineum, brushed a fly off her arm, and said she felt no pain whatever, only a sense of stretching and pressure. She weighed 7 st., and had lived a natural life. The perverted starches were avoided and grains were ground daily by means of a small mill; plenty of fruit and vegetables were used, also tea made of blackberry leaves.

Dr. Gionmi's Cases (New South Wales).

Dr. Gionmi has seen seven cases in twenty-six years of Australian practice; all were strong, healthy, hard-working women. He considers the painless cases normal in every respect. He also has records of cases in Naples.

CASE 6.—A woman, aged 36, had given birth to four infants at Dr. Gionmi's private hospital, the first two before either doctor or nurse could be informed; for the birth of the other two a special watch was kept. The mother was healthy, robust, and hard-working. She never had a pain, although the womb could be felt contracting strongly. The waters broke with a gush, and a few minutes later the child was born. Ten minutes afterwards the placenta was expelled without any trouble, pain, or inconvenience. Involution was more rapid than in the best of the average cases. She would only admit a certain discomfort at the passage of the head at the soft parts at the very last.

CASE 7.—Aged 27, was living in a tent. The womb was seen to be contracting well though there was no sign of pain, and the foetal head appeared at the vulva painlessly. The placenta followed in ten minutes without pain, and the womb became well contracted. She got up the next day and did her work as usual. Questioned as regards her feelings her answer was as in the previous case.

Dr. Gionmi's other cases were of a similar nature.

Dr. Allison's Cases (New South Wales).

CASE 8.—This patient was a frail, anaemic woman of somewhat slow cerebration. The history of her first labour was that at 6 o'clock one morning she arrived at hospital saying that the "waters had burst." The head was found to be well on the perineum. She had had no pain or discomfort, but a "feeling of stiffness" low in the abdomen. There was no change at 3 p.m., so the patient was anaesthetized, and forceps delivery was performed. The puerperium was uneventful. In her second confinement the onset was exactly the same, including "stiffness" low in the abdomen, the "waters had burst," and the head was on the perineum. She remained thus and comfortable for four hours with the head visible, and despite pituitary extract in two 1/2 c.cm. doses given hypodermically at an hour's interval, she made no further progress. Forceps were therefore applied and the puerperium, as before, was uneventful. In her third confinement Dr. Allison saw her at 10 a.m. She had taken castor oil one hour before, and said she could just feel "a little stiffness" coming on. The head was well into the cavity of the pelvis, the cervix being undilated and situated far back. At 2 p.m. she decided to walk a distance of one hundred yards to the hospital. When half-way there the child was born. She said later that she had had absolutely no pain, not even discomfort, as she merely felt the touch of the baby on her thighs demonstrating its presence. This patient's pelvic measurements were normal, and there was never any difficulty with the third stage of labour, which lasted twenty minutes or thereabouts.

CASE 9.—Dr. Allison attended this patient at her second labour; she said that Caesarean section had been pondered at her first confinement. External pelvimetry showed a flat pelvis, and the sacral promontory could be easily felt by vaginal examination; this was at the fifth month of pregnancy. At the eighth month the foetal head was well into the pelvis, the lower segment being stretched and the cervix high up posteriorly. The anterior shoulder appeared to be to the left near the iliac spine. The head was undoubtedly lying in a transverse diameter. The patient entered hospital four days before parturition, and on the day of her confinement she complained of feeling "heavy" low in the abdomen. The membranes burst suddenly and unexpectedly, and the nurse found the head appearing at the vulva; after this the patient had two pains which were severe enough to cause her to cry out, and a child was born weighing 7 lb. It was stated that this case under the commonest conditions would have required early induction or Caesarean section, judging from

pelvimetry, but constant supervision showed the head past the brim with apparently nothing to prevent normal full-time labour.

Dr. Agnes Bennett's Cases (New Zealand).

CASE 10.—A primipara, who was a rather small-framed woman, suddenly woke with feeling "water" coming away; she jumped up and threw herself on her knees just as the child emerged. This patient feared that this would happen a second time, but it did not do so. The second labour was an average painful one, but she preferred it to the former, from the shock of which it took her a long time to recover.

CASE 11.—This patient awoke in the night to find the birth occurring. While her husband was telephoning for the doctor the child was born in the bed.

CASE 12.—A delicate anaemic primipara was in hospital for antenatal treatment; one evening she felt an urgent call to stool, and the child was found in the pan, alive and uninjured.

CASE 13.—An unmarried girl was found in bed very pale, weak, and collapsed, with a dead child, the placenta, and severe haemorrhage. She said that she had had no pain, and did not know that the child was born.

CASE 14.—A patient with threatened eclampsia was being treated with packs and saline aperients when a child was suddenly born in complete membranes. Mother and child both did well.

References to painless labours, and reports of such cases, have appeared in the literature from time to time. In the *British Medical Journal* in 1906 instances of painless birth were reported by Renshaw, Trevor Roper, Irving, Young, Allan, Spurway, Scott Dickson, and Macphail; in 1928 cases were recorded by Burn, Masser, Patton, Hobbs, and Russell. In a discussion in the *American Journal of Surgery, Gynecology and Obstetrics* in 1911 cases of painless labour were reported, and again in the same journal in 1922. In the *Clinical Journal* for 1917 Percy Allan reports and classifies two cases, and refers to cases published in the *Medical Record* in 1892. References or scanty reports will be found in the following textbooks.

Burns's *Principles of Midwifery*, 1844; Chailly's *Midwifery*, 1844; Robert Lee's *Lectures on Theory and Practice of Midwifery*, 1844; Coffin's *Treatise on Midwifery*, 1866; Barnes's *Lectures on Obstetric Operations*, 1875; Playfair, 1878, gives a case; Leishman's *A System of Midwifery*, 1876; Smellie's *Treatise on Theory and Practice of Midwifery*, vol. ii, 1877; Spiegelberg's *Textbook of Midwifery*, vol. ii, 1888; Charpentier's *A Practical Treatise on Obstetrics*, 1887; Galabin's *Manual of Midwifery*, 1886; Cazeaux and Tarnier (translation), 1885; Parvin's *Science and Art of Obstetrics*, 1895; Garrigues, 1902; Williams's *Obstetrics*, 1903; Munro Kerr's *Operative Midwifery*, 1911; and his *Combined Textbook*, 1923; Munro Kerr and Hendry's *Notes on Midwifery*, 1920; De Lee's *Principles and Practice of Midwifery*, 1920; Depaul's *Lectures on Obstetrics* (in French, date not noted).

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- ² DeGaris: Definition of Normal Labour, *Medical Journal of Australia*, 1925.
- ³ Idem: *Clinical Notes and Deductions of a Peripartetic*, 1926.
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Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

FOREIGN BODY IN THE BLADDER.

THE case recorded on September 15th (p. 490) recalls a very similar occurrence which I met with many years ago.

A man, nearly 80 years old, who had led a "catheter life" owing to prostatic enlargement for eighteen years, broke the end of his catheter in exactly the same way as described by Dr. Ferguson, and for the same reason—that is, spasm at the neck of the bladder and urethra. I tried first to remove the broken piece, which was about an inch and a half in length, by passing a long fine sinus forceps down the urethra, but failed. I then told him that it would be necessary to administer chloroform and cut down on the impacted fragment, but he refused to take an anaesthetic. It occurred to me that perhaps I could move it along from behind, so, placing him on his left side, I introduced the left forefinger into the rectum and pushed firmly in the direction of the urethra, the patient at the same time squeezing the penis in the same direction. To the great relief of both of us this manoeuvre was successful, and the broken piece of catheter emerged from the meatus.

I suggest that anyone meeting with another case of this description might think it worth while to try this procedure before resorting to operative measures. The notes of this case were read and the specimen shown at a meeting of the Plymouth Medical Society.

Yelverton, S. Devon.

H. W. WEBBER, M.D. Lond.