lameness with pain on walking and in the bottom of the back on stooping. The seventh pregnancy ended in a still-birth. At the end of the eighth pregnancy she was brought in labour to the Leeds Infirmary (March 18th, 1906). She said that she had lost much in stature and she walked very lamely, stooping forwards, and she complained of pain when lifted in bed. The head was presenting. The pubic arch was narrowed, so that in trying to take the oblique conjugate the finger would not pass up to the bottom of the symphysis. There was rostration of the os pubis. As there were grounds for thinking that the vagina was not aseptic Cæsarean section was not performed, but the child was delivered by version, the after-coming head requiring perforation. I thought the pubic arch opened a little during extraction, as sometimes is the case in soft-boned pelvis of this sort. The patient made a good recovery. She was admitted again on June 18th, 1907, in the last month of her ninth pregnancy. She was very sallow and very lame and had lost weight. Cæsarean section was performed on June 22nd at about the time when labour was supposed to be due. It presented no difficulties and both ovaries were removed with a view of curing the osteomalacia. She recovered without complication. The child was a puny male weighing barely four pounds. He was incubated and every effort made to rear him. He could swallow and did not at first suffer from vomiting or diarrhoea. At the age of three weeks Dr. W. H. M. Telling kindly took him under his care at the Hospital for Women and Children. As diluted milk did not then agree with him he was fed on peptonised milk and was kept in the incubator. The temperature was always subnormal, and if an attempt were made to take him out of the incubator the condition would become worse. He never weighed above four pounds and died suddenly in the eleventh week of life. In December, 1907, the mother reports that she keeps very well "in herself" and that she has less pain in her legs, is not so lame, and can get about much better.

As I have published a clinical lecture on the history and technique of Cæsarean section with nine previous cases performed in this hospital,¹ I will here only note a few points which these nine additional cases suggest. So far as the mother is concerned it is entirely satisfactory to operate before labour begins, but the interests of the child are best secured by waiting until the full term of pregnancy, for the longer it can be incubated in its mother's womb the better it is qualified to live and thrive in the world outside. Calculations as to the duration of pregnancy are notoriously uncertain, and, indeed, the period of utero-gestation is not a fixed quantity. In all ranks of society we hear of unborn children who are considered to be *overdue*. The fact is that the fruit falls when it is ripe and it is a mistake to gather it prematurely; and there seems to be some danger of doing so, judging by my experience, if labour be anticipated. The operation is very easy and safe in experienced hands, granting only that the patient has not been the subject of ill-advised attempts to deliver in other ways and that she is in an unimpaired condition, and that the parturient canal is aseptic. I do not think that any personal precautions of the operator can give absolute certainty that the vagina and cervix are quite free from pathogenic organisms. A case is on record where a child delivered by Cæsarean section was found to have the conjunctiva infected by purulent ophthalmia, so that presumably infection was present above the os internum. There is a possibility of a uterine stitch abscess sometimes arising through infection from the endometrial surface of the uterine incision. If there should be any reason to suspect this after operation the treatment would be to take out the lowest abdominal stitch and insert a rubber drainage-tube. During operation it is well not to make the incision too low, but avoiding the lower uterine segment to extend upwards rather than downwards.

In regard to sterilising, my practice has hitherto been to be largely guided by the expressed wishes of the two parents. I think that Cæsarean section ought to be more frequently performed for contracted pelvis when experience has proved that the mother cannot bear living children even though the pelvic diameters place the case on the border line of possible delivery as laid down in text-books. Osteomalacia is rare in the West Riding as in other parts of England, but I have seen two cases in the last seven years. The case here recorded seems to have benefited decidedly from oöphorectomy, as osteomalacia usually does.

Leeds.

THE PROTRACTED USE OF DIGITALIS.

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THE use of digitalis as a drug has been compared with that of the whip applied to an overworked horse. The *protracted use* of the drug may well be looked upon as crutches which enable sufferers from cardiac diseases to hobble along for a very long time to come. It was chance that led to the appreciation of this method. A highly intelligent engineer suffering from hypertrophy of the heart had for five years continuously taken small doses of digitalis—his state of health being under careful observation during that period—without any phenomena of poisoning manifesting themselves. Kussmaul utilised this case at the time in order to discuss the question of digitalis poisoning consequent upon so-called accumulation. This method of applying the drug by way of protracted medication and in small, almost homœopathic, doses, so to speak, dates back, however, much farther than is generally assumed. For from the *Charité-Annalen* one learns that Fräntzel (whose writings are an almost inexhaustible source of information for later authors) already employed the *dosis refracta* of digitalis.

It is certain that digitalis administered in the way which was formerly customary when employed for a long period of time, even in small doses, had a so-called cumulative effect in many instances, whilst in others such medication proved quite ineffective. Such refractory cases, however, will always be met with. Eichhorst has shown that it is necessary for the cardiac muscle to be sufficiently capable of performing its function if digitalis is to take effect. Should this not be the case the effect does not ensue, and provided the digitalis preparation used is a good and reliable one its failure to produce an effect on the heart suggests a thoroughly unfavourable prognosis, for in such cases no other remedy is likely to prove of service.

Again, in other cases the cumulative effect takes place because the excretion of the active substances does not keep pace with the absorption, and strict supervision, therefore, becomes imperative. It was strange that such a cumulative effect is not constant. Some authors have noticed it and thereupon prohibited its protracted administration; others have not observed it or have done so but seldom, and continued its use. Naunyn may be right in advocating the view that in general there are no urgent reasons for fearing the cumulative effect of the drug. Until very recently, however, we had no explanation of the cumulative effect; experimental evidence was absolutely lacking.

From the recent researches of Focke and others we know how varied is the amount of efficacious substances contained in digitalis leaves and how fluctuating the proportion of active principles. Hence we can well imagine why a cumulative effect ensues in one case and remains absent in another.

This subject had been made clearer and more understandable from the recent writings of Cloetta,¹ who showed by experiments on animals that the effect produced by crystallised digitoxin differed from that due to the amorphous digitoxin.

Fränkel² was the first to make experiments on animals. He employed digitoxin in the crystallised form and found that injections of very small doses into cats were followed by cumulative effects. Now, when it was observed that digalen (digitoxinum solubile Cloetta) did not produce a cumulative effect in the respective patients the fact was very remarkable, considering that the majority of the authors looked upon the cumulative effect as being characteristic of a serviceable preparation. It was all the more puzzling since in the experiments on animals no difference was observed in the effect produced on the cardiac muscle by digalen and crystallised digitoxin respectively (Freund,³ Sasaki⁴). Experiments according to Fränkel's method had hitherto, it is true, not yet been made. The fact was borne out by the increasing number of results obtained in practice showing that the administration of digalen to sufferers from cardiac diseases was not followed by cumulative effects.⁵ I have

¹ Münchener Medicinische Wochenschrift, 1906, No. 47.

² Archiv für Experimentelle Pathologie und Pharmacologie, vol. li.

³ Zeitschrift für Experimentelle Pathologie und Therapie, 1905, vol. .

⁴ Berliner Klinische Wochenschrift, 1905, No. 26.

⁵ The cumulative effect was not observed by Dennig (Jahrbuch

not observed any such effect in the numerous cases under my care.

Now Oloetta's experiments on animals have clearly demonstrated that there exists a difference between these preparations, inasmuch as after protracted digalen treatment no cumulative effect was observed in cats, whereas crystallised digitoxin caused in the same animals vomiting, salivation, and anorexia, besides arrhythmia. Oloetta has shown that it is not the molecular weight of the substance (280 as against 552 of crystallised digitoxin) which decides the toxic effect produced, but *the fact that the preparation has been crystallised*.

Several French preparations containing crystallised digitoxin, after trials made for the sake of verification, were found to have a cumulative effect. By way of analogy Cloetta refers to the behaviour of an amorphous form of physostigmine, which also differs in its action from that of the crystallised form (Harnack). Hence the cumulative effect observed by many authors to follow the use of digitalis explains itself by the fact that in the digitalis leaves employed the amorphous digitoxin contained in the fresh preparations must have been transformed into a state analogous to the crystallised digitoxin, a fact which has likewise been proved by Cloetta.

Cloetta's experimental researches are the first which have reliably demonstrated the fact that there is a digitalis preparation—namely, digalen—which does not possess any dangerous or disagreeable cumulative action.

The question now arises, In which of the cardiac diseases is it advisable to resort to protracted medication? Even the acute disorders frequently required a longer period of medication than that which was customary, and one often had recourse to the expedient of giving strophanthus or camphor in between, resuming the digitalis medication after an interval of several days. Even more than the temporarily disturbed valvular defects *do the chronic affections of the cardiac muscle need protracted treatment*. Seeing that these affections predominate in medical practice the prolonged use of digitalis assumes a still greater importance. In patients suffering from fatty heart digitalis, as a rule, does not agree. In the case of fatty degeneration even digitalis cannot save what has been lost already. In neurotic diseases of the heart good results are but seldom seen except when the cardiac muscle is involved. Accordingly the following indications are left as being the most important—viz., myocarditis in all stages and of any pathogenesis, myasthenia cordis chronica with or without dilatation and hypertrophy, and weakness of the heart in the case of hypertrophy of the left side of the heart after nephritis of long standing.

Let me now describe briefly how the treatment is carried out. Kussmaul and Naunyn recommended protracted medication in all cases in which the usual mode of treatment did not produce long-lasting results and in which the phenomena of cardiac insufficiency reappeared within a very short time. They prescribed the digitalis leaves in substance in the form of powders or pills, 0.05 to 0.1 gramme per day; if required the dose was given twice a day. When the effect diminished the dose was afterwards increased. These authors laid stress on the fact that after long-continued use a lasting result might be ultimately obtained and then digitalis might be dispensed with.

This mode of treatment may, it is true, in conjunction with strict supervision, be free from danger and be serviceable, but in view of the unreliability of the drug one must always be prepared to face a cumulative effect. Seeing, however, that in digalen we have at our disposal a preparation—in fact, the only one of the numerous digitalis preparations produced during the last few years—which is exempt from a cumulative effect, it is better than any other official preparation suited for protracted medication, as here all the dangers inherent in the other preparations are absent.

As regards the pharmacology of this preparation I would refer readers to Cloetta's respective essays.⁶ I would add a few remarks about the dosage in the case of protracted medication. Seeing that 0.15 gramme of folia digitalis corresponds to 1 cubic centimetre of digalen = 20 drops (16.9 minims), from 7 to 14 drops (= say 6 to 12 minims) would have to be administered once or twice per diem in the case

of protracted medication; and, indeed, this small dose suffices to maintain the compensation in suitable cases.

Since the introduction of digalen I have given it in all suitable cases and always with satisfactory results. No disagreeable gastro-intestinal disturbances at any time manifested themselves. Of all the allied preparations I deem digalen most suitable for protracted medication. The usefulness of this drug in cardiac disease has recently been highly spoken of by Dr. Ernest von Leyden, my friend and respected teacher.

SUPRARENAL HÆMORRHAGE IN AN INFANT: ITS RELATION TO HÆMOPHILIA.¹

By B. G. MORISON, M.D., C.M. EDIN.

THE following case of hæmorrhage into the suprarenal body presents certain features which may, I hope, justify its publication. These are—the occurrence of the lesion very shortly after birth, its characteristic type, and particularly the observation of a hæmophilic tendency prior to any of the more obvious signs of adrenal injury.

A male infant, a first child, was born about the middle of the ninth month of pregnancy after normal labour. The umbilical cord, a thick one, was tied three times in succession on account of bleeding which appeared at the seat of ligature. The ligature was made thick and its material varied in order to obviate damage to the vascular walls, but apparently in vain. On the third occasion a little blood was seen to burst through the cord (uninjured here) above the ligature. Finally, the cord was bound round with double cyanide gauze, kept dry, and regularly dusted with boric powder. It is my practice to allow a child to cry before tying the cord. I mention this because Kiwisch and others have attributed hæmorrhage in newly born infants to undue haste in applying the ligature. Nothing further was noted in this case until the ninth day, when the child seemed weak and would not take the breast. There was some jaundice but the stools were healthy and the cord was dry. There was no umbilical redness. On the tenth day the infant was stronger; snuffling was noticed and small doses of grey powder were prescribed in view of any possible specific taint, though the history did not justify this suspicion. The stools were green. On the eleventh day the cord was nearly off but was still attached. Seen again on the seventeenth day the child was feeding fairly well; the cord had just become detached. On the two following days the parents noticed some rather bright-red patches on the chin. The child became somnolent and refused nourishment, but had neither sickness nor diarrhoea. On the day following I was sent for. The child had suddenly become much emaciated and generally worse during the night. There were bright-red patches on the chin, round the mouth, toward the back of the scalp, and at the tips of the fingers and toes. The scrotum was rather full, red, and slightly eroded. The navel, still being dusted with boric powder, was surrounded by a red, rather prominent ring within which was an unhealed surface. At the circumference of this there was slight separation of cuticle. The heart beat was fairly strong and for the first time a rise of temperature was noted (100.8° F.). The child was "slightly convulsed" all day, as I learned afterwards. At 9 P.M. the temperature was 102°, the erythematous spots were disappearing, but the scrotum was more full and livid. The stools were yellow for the first time in ten days. Death occurred at 11 P.M. on this the twentieth day after birth.

Post-mortem examination showed a red lividity about the chin and mouth, the scrotum full and livid. The thoracic and abdominal viscera generally were apparently normal but for the presence of passive congestion; the spleen was of a deep slate-blue colour, not softened, and on section showing nothing noteworthy; the pancreas was normal. The right suprarenal body was also normal though passively congested; the left was very dark slate-blue. Opened *in situ* it at once collapsed and shed its fluid contents into the abdomen. On examination it appeared to be converted into a blood sac, was very soft, and partly torn in removal. There were no signs of inflammation spreading up from the umbilicus and the umbilical cord inside the abdomen was small, pale, and

prakt. Med. 1905; De Renzi (Nuova Rivista Clinico-Terapeutica, 1905, No. 7); Bozzolo (Gazzetta degli Ospedali e delle Cliniche, 19.5, Nr. 9); Schwyzer (Medical News, 1905, No. 21); Silvestri e Fiorio (Gazzetta Medica Veronese, Anno I., No. 7).

⁶ Münchener Medicinische Wochenschrift, 1904, No. 33.

¹ From notes communicated to the Æsculapian Society.