have some grounds for stating that the method in cases of intussusception possesses a further special advantage in that it produces flaccidity of the bowel wall itself and so facilitates reduction. In two other cases of ileo-cæcal intussusception operated upon under spinal anæsthesia, as well as in that reported in detail here, reduction seemed unusually easy till the terminal cedematous portions were reached. In both of these cases, too, shock during and immediately after the operation was conspicuous by its absence, a fact which no doubt contributed towards the final recovery of both children. Both of the children were fed by the mouth while the abdominal wounds were being closed. On physiological grounds it would seem that loss of tone in the muscular coats of the bowel is quite a possible result of fairly high spinal anæsthesia, although the vagi escape the temporary paralysis. As to the method employed in uniting the bowel ends, we used a Murphy button rather in desperation, having in mind the almost inevitable result in such cases and believing that this method is slightly more rapid than uniting the bowel by a double row of continuous suture. It is somewhat remarkable that in two of the four successful cases under 12 months a Murphy button was used, this being the method adopted by Peterson in his case.

As to the after-treatment, it is surprising what little effect the withholding of all food has upon a child, provided plenty of saline solution is given subcutaneously or by the bowel. Our case had about three pints of saline a day, and this, assisted by the minute doses of morphia, seemed to satisfy her. She was the typical fat, healthy, "intussusception" baby, and a week's fasting had no very marked effect upon her appearance. These cases make great demands upon the skill and ceaseless attention of their nurses; our case was fortunate in obtaining an abundant supply of both. Without entering into a discussion of all the points arising from Parry's suggestion of performing a lateral anastomosis in preference to a resection, we must own to having grave doubts as to the wisdom of leaving a gangrenous, or possibly gangrenous, intussusception untouched in the abdomen. Although Parry's case and another which he mentions, and which was operated upon in a similar manner by one of his colleagues, were both successful, in neither does gangrene appear to have been present at the time of operation. In conclusion we would suggest that spinal anæsthesia has considerable bearing on the question as to the best means of dealing with these desperate cases, since it enables the surgeon to resort to the most radical measures with a comparative absence of shock, a condition of things impossible under anæsthesia induced by any other method.

A HOME OF REST AT LEICESTER FRITH.—In extension of a scheme which was started three years ago for the purpose of providing nursing accommodation for people of limited means an appeal is being made for £5000 in order properly to furnish and equip Leicester Frith as a home for chronic invalids and aged and infirm ladies and gentlemen. Donations and subscriptions may be paid to the honorary treasurer, Alderman Tollington, Moreley House, London-road, Leicester, or to the London, City, and Midland Bank, Limited, Leicester. A donation or collection of £100 will entitle the giver to a place on the general committee and to nominate a paying patient.

MEDICAL SICKNESS AND ACCIDENT SOCIETY.—The usual monthly meeting of the executive committee of this society was held on Jan. 21st, Dr. F. de Havilland Hall being in the chair. There were also present Mr. J. Brindley James, Dr. J. W. Hunt, Dr. W. Knowsley Sibley, Mr. J. F. Colyer, Dr. W. A. Dingle, Mr. Edward Bartlett, Mr. F. S. Edwards, and Dr. J. B. Ball. The accounts presented showed that the business of the society during the year 1909 had been very satisfactory. A large increase had been made in the amount of the invested reserves, and the number of new entrants had been above the average. The full accounts will be presented to the members at the annual general meeting to be held in May next. The committee examined over 40 special reports on the condition of the chronic cases. Little hope was found in any of them that the member would ever be able to resume professional work. The usual amount of sick pay drawn by these members is 104 guineas a year, and this is payable until age 65. Prospectuses and all further information on application to Mr. F. Addiscott, secretary, Medical Sickness and Accident Society, 33, Chancery-lane, London, W.C.

A CLINICAL APPARATUS FOR OBTAINING GRAPHIC RECORDS OF BLOOD PRESSURE.¹

BY CHARLES SINGER, M.A., M.B. OXON.,
M.R.C.P. LOND.,

MEDICAL REGISTRAR TO THE RESEARCH DEPARTMENT OF THE CANCER HOSPITAL, BROMPTON, S.W.

THE ordinary needs of the clinician in measuring *systolic* blood pressure are sufficiently met by the various forms of mercurial sphygmomanometer in general use; the reading of the *diastolic* pressure on these instruments is often, however, difficult, and this defect is the more felt as the relationship between systolic and diastolic pressures has become a matter of increased scientific interest. Moreover, it is frequently desirable to obtain a *graphic record* of the pressure conditions, a record from which the personal factor has been as far as possible eliminated, and this is not yielded by the apparatus in question.

A number of instruments have, however, been devised, all of them of a complex type, to register these points in a graphic manner. An early attempt was that of Dr. Joseph Erlanger, whose instrument, though very delicate, by no means eliminates the personal factor, while its readings, even when taken with the greatest care, are sometimes equivocal.² In 1907 Dr. G. A. Gibson of Edinburgh described³ an instrument that had been designed by him which was without some of the defects of Erlanger's and other previous apparatus. I have had considerable experience in the use of a model of this ingenious apparatus, which is both delicate and accurate and capable of giving objective records. A grave objection to it, however, is that it is exceedingly cumbersome and heavy, so much so that it is quite useless for ordinary bedside purposes. It is, moreover, difficult to adjust and liable to get out of order during transit.

After a number of experimental efforts I have succeeded in constructing an instrument on similar principles to Dr. Gibson's, but more adapted to clinical needs, without sacrifice of the accuracy of the older instrument.

The principle on which the apparatus acts is essentially that of the Hill and Riva-Rocci instrument which has obtained such vogue among clinicians. The upper arm of the subject on whom the observation is being made is compressed until the pulse in the wrist below ceases. Pressure is then gradually reduced until it is equal to, or slightly lower than, the force exercised by the heart during systole, so that the pulse can again be felt. The pressure which permits pulsation to first reappear is read on a mercurial manometer to which a scale is attached. As the pressure is still further lowered the mercury in the manometer shows marked oscillations, and the point at which these are of greatest amplitude is regarded by most writers as the diastolic pressure.

The manometer of the present instrument is of the uniform U-shaped type adopted by Dr. C. J. Martin⁴ in his modification of the Riva-Rocci instrument, and its lumen is that recommended for the physiological kymograph by v. Kries⁵—viz., 4 millimetres in diameter. The mercury when at rest reaches to the zero of a vertical scale, 150 millimetres long, graduated so that each $\frac{1}{2}$ millimetre length on the scale is marked as a whole millimetre (*vide H* in Fig. 1).

On the surface of the mercury in the open limb of the manometer there rests a light ivory float (A in Fig. 1). On this is fixed a very light but rigid upright which emerges from the top of the open limb, and is bent on itself at B and C, while attached at D is a light pen E, which writes in ink on a revolving cylinder G. The closed limb of the manometer H is connected by a thick rubber tube with an air-cushion which completely surrounds the whole girth of the upper arm, and which is held in place by an inelastic leather cover secured by straps. Within the armlet and air space above the closed limb of the manometer pressure can be

¹ Demonstrated before the Physiological Society on Dec. 11th, 1909.

² The reader who is interested in the subject will find a full account of the apparatus in Janeway's "Clinical Study of Blood Pressure."

³ G. A. Gibson: Quarterly Journal of Medicine, 1907, vol. i., p. 103; Proceedings of the Royal Society of Edinburgh, vol. xxviii., January, 1908.

⁴ C. J. Martin: Brit. Med. Jour., April 22nd, 1905.

⁵ v. Kries: Archiv für Anatomie und Physiologie, 1878.

raised and lowered at will by means of an indiarubber air-pump provided with a T-piece and liberating screw (vide Fig. 1).

Pulsation in the radial artery is recorded by a second pen (marked 0 in Fig. 1) which writes on the cylinder vertically below the first. The second pen is moved by a tambour, N, connected with a pad on the radial pulse by a second tube. This pad consists of a small indiarubber sac filled with fluid and fixed into a hollow metal cup, the apex of which opens into a tube connected with the tambour. The pad and cup are not shown in Fig. 1, where an older form of tambour has been represented. They are attached to a light adjustable frame, by means of which the pad can easily and rapidly be brought into contact with the radial pulse with any required degree of pressure.

In using the instrument the revolving cylinder (which is detachable) is surrounded by a sheet of paper held in place by two elastic bands. The pens are inked with methylene blue ink and apposition to the cylinder secured in the case of the upper one. (This can be done by placing the apparatus very slightly out of the vertical, as by putting a coin or other small object underneath the front of the clock-work base.)

A horizontal line, the abscissa of Fig. 2, is traced and the armlet is then put in place and secured. The pad is now fixed to the wrist over the radial artery in such a way as to give a maximum movement of the tambour. Lastly, the lower pen is adjusted so as to write on the cylinder and the latter is set revolving. Pressure is now raised within the armlet (the upper pen rising in indication) until the pulse at

A new form of self-recording sphygmomanometer for clinical use. For lettering see text.

FIG. 2.

Systolic pressure 121 mm. Diastolic pressure 87 mm.

the wrist ceases to beat, as shown by the immobility of the lower pen; and finally, when this condition has been secured, pressure is gradually and uniformly released until the atmospheric level is again reached. The cylinder can now be stopped and the record removed and examined.

The type of tracing yielded is shown in Fig. 2. The straight portion which forms an interruption in the lowest line (which is derived from the radial pulse) represents the period during which the pressure on the upper arm was so high that no pulse was able to reach the wrist. The irregular line above the abscissa records the varying pressure in the armlet as represented by the height that the surface of the mercury in the open limb of the manometer is from time to time above its position of rest. The oscillations represented on this line correspond to the pulsation in the upper arm which increases and eventually again decreases as the pressure is gradually lowered. These excursions are at their maximum when the pressure on the arm is equal to the internal pressure on the brachial artery during diastole.

To read the systolic pressure from the record the point is taken at which pulsations first show themselves on the tracing derived from the radial artery after the pressure on the upper arm has been sufficiently released. The distance between the abscissa and the upper line, in the same ordinate as this point, multiplied by two, gives the mercurial pressure which the force of the heart during systole is just able to overcome—i.e., the systolic pressure. To obtain the diastolic pressure the vertical distance between the middle of the largest oscillation in the upper line and the abscissa is measured and multiplied by two. This result is also expressed in terms of mercurial pressure.

The instrument fits into a case the internal dimensions of which are $14\frac{1}{2} \times 5 \times 4$ inches. The detachable cylinder has a removeable top and the cavity within forms a convenient receptacle for the armlet, radial pad, &c., which go

with the apparatus. The arm to which the lower pen and tambour are attached slides inwards when not in use to further economise space. The instrument is light enough to be easily carried in the hand and is therefore adapted for clinical as well as laboratory use. It is made by Messrs. T. Hawksley and Son.

I have to thank my friend and teacher, Dr. Alexander Paine, for kind suggestions during the writing of these lines, and Sir Lauder Brunton and Dr. T. J. Horder and Dr. N. H. Alcock for advice and encouragement.

A CASE OF
FATAL CEREBRAL HÆMORRHAGE
FOLLOWING GASTRO-JEJUN-
OSTOMY FOR PYLORIC
OBSTRUCTION.

By C. HAMILTON WHITEFORD, M.R.C.S. ENG.,
L.R.C.P. LOND.

THE occurrence of cerebral hæmorrhage as a complication of an ordinary operation, performed under general anaesthesia, although not unknown, is probably rare. The following case is reported in the hope that those readers of THE LANCET who have met with similar instances may be induced to record them in its columns. The patient, a robust-looking man, with a 12 months' history of gastric trouble, was seen on Dec. 15th, 1909, on account of incessant vomiting, which had commenced four days previously, of large quantities of brown, turbid, odourless, neutral fluid. He also suffered from severe and frequent cramps of the arms and legs. The temperature was 100·6° F. and the pulse 120. The urine, acid, of specific gravity 1026, contained a trace of albumin. Nothing abnormal was found in the heart. The arteries felt healthy, but the subcutaneous veins in the bend of the elbow were markedly thickened, possibly owing to the patient's arduous work, that of a smith. Under stomach lavage and saline solution per rectum the tetany disappeared, the temperature dropped to normal, and the pulse to 90, but everything taken by the mouth was still vomited. At no time was bile seen in the vomit.

On Dec. 18th, on opening the abdomen, I found a mass occupying the pylorus, with another mass, probably secondary to that in the pylorus, in the gastro-colic omentum. No other deposits were visible or palpable in either the liver or peritoneum. The ordinary no-loop posterior gastro-jejunosomy was performed. Mechanical difficulties, which prevented hæmostasis by clamps, caused the operation to last two hours. The anaesthetic, with which there was no struggling or other difficulty, consisted of chloroform-ether mixture (C₁E₂) in a Rendle mask for the first 20 minutes, and for the remaining 100 minutes of ether with a small percentage of chloroform given from a box with an open air-inlet, from which the vapour was led by a tube to a facepiece with inspiratory and expiratory valves. No bag or re-breathing apparatus was at any time employed. Brisk corneal and pupillary reflexes persisted throughout. At the end of the operation the pulse was 130, strong and regular. After operation the patient was replaced in the Fowler position.

The next morning he was very drowsy, and on examination 22 hours after operation was found to have complete flaccid paralysis of the right face, arm, and leg. The tongue, when protruded, deviated strongly to the right. Attempts at speaking were made, but were unintelligible. The limbs on the left side were repeatedly making purposive movements, such as stroking the moustache with the fingers. The pulse was 120, and the temperature 99°. Of urine, 15 ounces in the morning and 10 ounces in the evening were withdrawn by catheter. Post-operative sickness was very slight, only a few ounces being vomited soon after operation. A stomach tube was passed and showed that the stomach contained only a small amount of altered blood. Liquids were freely taken and retained. The abdomen was flaccid and moved freely with respiration. The drowsiness deepened into coma and death occurred 36 hours after operation. No necropsy was made.

Plymouth.

* This case has many points of interest and we therefore publish it with pleasure, but we hesitate to accept the

diagnosis that the fatal issue was necessarily due to cerebral hæmorrhage. It appears to us that an embolus or thrombosis of the cerebral vessels might equally well explain the phenomena. Within recent years many cases have been recorded of cerebral thrombosis following abdominal operations, and we are inclined to place Mr. Hamilton Whiteford's case in this category.—ED. L.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

MEDICAL SECTION.

Treatment of Tetanus.

A meeting of this section was held on Jan. 25th, Dr. J. MITCHELL BRUCE being in the chair.

Dr. LLEWELLYN PHILLIPS (Cairo) communicated a paper on the Treatment of Tetanus by the Intraspinal Injection of a Solution of Magnesium Sulphate. He considered that the case mortality of tetanus, even with the use of antitoxin, was still very high. The figures over a number of years gleaned from St. Bartholomew's Hospital reports gave a mortality of 56 per cent. The reports of the cases at the Government Hospital at Cairo showed a still higher mortality—viz., 75·8 per cent.—described by Dr. Phillips as an appalling figure. The main indications of treatment were to prevent further poisoning, to neutralise the poison already present, to nourish and conserve the strength of the patient, and to relieve symptoms. Antitoxin had proved somewhat disappointing as a curative measure, though as a prophylactic it was of great value. For the relief of symptoms, and so for the prevention of exhaustion, magnesium sulphate had been used in a 25 per cent. solution as an intraspinal injection. It had previously been shown that it was a spinal anaesthetic. Experiments made by Meltzer showed, further, that monkeys injected with tetanus toxin could be kept alive longer if they received injections of magnesium sulphate intraspinally. 21 cases had been published, chiefly in America, with a mortality of 42·8 per cent.—a very substantial improvement on former figures. To this Dr. Phillips added seven cases under his own treatment, of which four recovered, the same percentage mortality being observed. This substantial addition brought the number of cases up to 28, with 16 recoveries.

Mr. C. M. PAGE gave the details of a case of tetanus treated at St. Thomas's Hospital by intraspinal injection of a solution of magnesium sulphate in which death resulted, directly caused, in the opinion of Mr. Page, by the injection.

Dr. A. E. RUSSELL said that he had seen the spasms of strychnine poisoning controlled by spinal anaesthesia.

Dr. M. A. CASSIDY related a case of tetanus successfully treated at St. Thomas's Hospital by intra-theccal injection of anti-tetanic serum.

Mr. T. P. BEDDOES pointed out that in comparing the statistics on the subject it must be remembered that in London cases of tetanus came under treatment earlier than the cases did in Cairo.

PATHOLOGICAL SECTION.

Thyroid and Antithyroid Preparations.—Oöphorectomy.—The Pancreatic Reaction in the Urine.—Caseation of Adrenal Capsules.—Pigmentary Deposits in Liver and Pancreas.—Chylous Cyst.

A MEETING of this section was held on Jan. 18th, Dr. F. W. MOTT, the President, being in the chair.

Mr. WALTER EDMUNDS read a paper on the Action of Thyroid and Antithyroid Preparations. The experiments were made on rats with commercial thyroid and antithyroid preparations. Altogether 10 experiments were made and four controls used: the controls remained well throughout. The preparations used were commercial and were given by the mouth in doses of 10 grains three times a day mixed with food. One thyroid preparation produced on two rats death or severe illness in 20 days. Another thyroid preparation produced the same result on two other rats in 18 and 19 days. An antithyroid preparation produced no effect on two rats during the 39 days it was given. Thyroid and