lunaris or through the right rectus abdominis muscle. If possible it should be made either in the linea alba or through the rectus. This avoids injury to the terminal portions of the intercostal nerves, as they go to supply the muscles. The incision is deepened until the peritoneal cavity is opened, or in those cases in which the cyst is adherent to the anterior abdominal wall the surface of the cyst is exposed. It is not unusual to find adhesions between the cyst and the abdominal wall. When the peritoneum has been opened the cyst will generally be exposed in the bottom of the wound. If any omentum or intestine protrude they are returned into the abdomen and protected by packing with flat marine sponges. An incision 2 inches in length, and parallel with the parietal wound, is then made in the exposed portion of the cyst. The margins of this incision are seized with cyst forceps, and the cyst drawn out of the wound. This proceeding helps to avoid the passage of the contents of the cyst into the peritoneum. The contents of the cyst are evacuated, the opening being enlarged if requisite. When the fluids and daughter cysts have been evacuated the interior of the cyst is examined with the finger, in order to ensure that all secondary cysts have been removed, and also to ascertain if there is another cyst in the adjacent portion of the liver. This is not probable, but it is advisable to make a routine examination of this kind in order not to overlook a second cyst. When the cyst is of moderate size and does not extend deeply into the hepatic tissue it may be possible to dissect out the true cyst from the adventitious wall of fibrous tissue which has been formed around it. If this can be readily done the cyst is removed, and the margins of the wound in the liver substance united by the insertion of a series of silk sutures. The insertion of sutures and the approximation of the lips of the hepatic wound are facilitated by the resisting wall of the cyst, which is composed of fibrous tissue.

If the cyst cannot be readily removed by dissection, it should be drawn well up in the parietal wound, and the distal portion, if practicable, cut away with strong scissors. Removal of a portion of the cyst wall enables the remaining part to close up by granulation more quickly, and the patient recovers in a shorter time than when the entire cyst is left behind. When this has been done the internal aspect of the cyst is well scraped with a Volkmann's spoon, in order to remove as far as possible the calcareous matter and the parenchymatous portion of the cyst wall. The interior of the cyst is then irrigated with an antiseptic solution and packed temporarily with a long strip of gauze or a sponge. Next the margins of the incision in the cyst are united to those of the upper portion of the abdominal wound by the insertion of a series of silk sutures. Each suture should pass through the marginal portion of the cyst, and then through the serous muscular and fascial layers of the abdominal wall. Some surgeons prefer to pass these sutures through the skin as well, but in my opinion it is an advantage not to pass them through the skin, since the sinus then closes up more quickly and a less marked scar results. That portion of the parietal wound which is not used for suturing the cyst is carefully closed by the insertion of a series of salmon-gut sutures. The packing within the cyst is now removed, and the interior of the cyst packed with a long strip of aseptic gauze, one end of which protrudes externally. This serves to absorb the secretion from the wall of the cyst, and to prevent the occurrence of hæmorrhage.

Ordinary aseptic dressings are now applied and fixed in position by bandaging. On the day after the operation the dressings are removed and the packing taken out from the interior of the cyst. The cavity is irrigated, a soft rubber tube of moderate calibre passed down to the bottom of the cyst and dressings applied. This method of dressing is repeated daily until the cyst cavity has closed up from the bottom and the external wound healed. The drainage tube is shortened as the cavity of the cyst contracts.

The silk sutures which have been used for attaching the cyst to the abdominal wall and for closing the external wound should be removed at the end of ten or fourteen days. Care must be taken to remove all of them, otherwise they may become a source of irritation and help to keep open a sinus or fistula longer than is necessary. I have several times seen a small persistent sinus remain after this operation which closed at once when the wound was examined and the stitches removed. A patient from whom I removed a cyst in this manner left the hospital with a sinus, which showed no tendency to close. After the expiration of several weeks I investigated the sinus and found several sutures. These I removed, and the wound at once closed. I saw this patient several months afterwards, when there was no sign of further trouble and the scar was quite sound.

It has recently been proposed to treat hydatid cysts in a manner somewhat different from the above. When the surface of the cyst is exposed through an abdominal incision its wall is incised and the contents completely evacuated. All hæmorrhage is arrested and then the cyst is dropped back into the abdominal cavity and the parietal wound closed. It is claimed for this method of treatment that the fluid which is secreted by the cyst is absorbed by the peritoneum without doing any harm, and that the period of treatment is considerably shortened. I have had no experience of this operation, but it appears to me that one runs a risk of contamination of the peritoneum, and subsequent development of cysts in connection with the peritoneum, and also of the possibility of adhesions being formed between the cyst and a coil of intestine which may become a cause of intestinal obstruction.

When the cyst extends upwards so as to encroach upon the thoracic cavity and is not readily accessible by the abdominal route without cutting through several inches of sound liver tissue, the parasite ought to be attacked through the chest wall by a transpleural operation such as the one described in connection with hepatic abscess and subphrenic abscess. The stages of the operation are similar.

When the cyst is situated in the posterior portion of the

right lobe of the liver and projects below the last rib, it may be dealt with through a lumbar incision similar to the one mentioned in abscess of the liver or subphrenic abscess.

When a hydatid cyst of the liver has ruptured into the peritoneal cavity the abdomen is opened, and the contents of the cyst removed from the peritoneum as far as possible. Then the cyst is treated as above. In like manner when the rupture involves the pleura, the escaped contents are removed through a thoracic incision and afterwards the cyst is stitched to the margins of the wound and drained.

PROGNOSIS.

Of the cases of which I have notes 21 were treated by an abdominal operation. Of these 16 recovered and 5 terminated fatally. Two of the fatal cases were suppurating at the time of operation, and in one death did not occur till four years afterwards, when suppuration occurred in a sinus which had remained not closed. One was treated by a thoracic operation with a fatal result. This was suppurating at the time of operation. Five cases were treated by aspiration, three of these were afterwards treated by an abdominal incision, and in the others the swelling still remained, but they were lost sight of and the final result was not known.

According to Thomas the mortality in cases which have been treated by the one-stage abdominal operation has been 10.29 per cent., and in those treated by the thoracic operation 29.4 per cent.

THE LETTSOMIAN LECTURES ON THE AFFECTIONS OF THE URINARY APPARATUS IN CHILDREN.

Delivered before the Medical Society of London.

By JOHN H. MORGAN, M.A. Oxon., F.R.C.S.,
Surgeon, Charing Cross Hospital and Hospital for Sick Children,
Great Ormond Street.

LECTURE III.

PATENT URACHUS.

A PATENT condition of the urachus after birth is not exceedingly rare, and is one of the causes of those masses of granulations which are found springing from the umbilicus, out of the centre of which, and issuing from a minute aperture, a fluid with all the characteristics of urine often exudes in small quantities. A ligature applied to the base of this fleshy tumour at once destroys it, and obliterates the canal leading to the apex of the bladder. This condition is usually noticed in very young infants soon after the separation of the cord, but Sir Thomas Smith relates a case in which it occurred in a boy aged 2 years, and Bryant one in a boy of 8, and the patency will occasionally persist into adult life, as in the case described by Paget, of Leicester, of a man aged 55, from whom he removed a ring-shaped calculus by a finger passed down through the navel and into the urachus. This and another patent urachus in an infant he succeeded in closing by paring the edges and uniting them with harelip pins. Should ligature of the granulation growth fail to close the canal, this may be effected by means of the electric cautery or by a plastic operation. Cases are recorded in which the urachus was reopened by pressure of the urine from below. Sutton states that the urachus may sometimes grow equally with the bladder, retain a communication with it, and give rise to a so-called bifid bladder.

HIATUS OF THE BLADDER.

Hiatus of the bladder is simply a persistence of the primitive cleft throughout the greater part of its extent, preventing the formation of the anterior wall of the bladder, the anterior abdominal wall, and the symphysis pubis, besides interfering with the formation of the external genitals. The cleft may be partly closed, forming various modifications of the deformity. In other words, it is an arrest of development which gives rise to this condition as well as that of epispadias. The extent may vary from a complete exposure of the posterior wall of the bladder, with separation of the recti and

imperfect union of the symphysis pubis, to the slightest condition of epispadias where only a portion of the wall of the urethra is exposed. Every variation between these two extremes may be met with. Sometimes the bladder, though in itself perfectly formed, may prolapse through the urethra or even the urachus.

The tortuous and dilated state of the ureters, which is a frequent accompaniment, may be due to the irritation of the surface from exposure, which induces a constant discharge from the ureters, and produces the same conditions as ensue from enuresis due to other causes. Although this complication has been frequently observed, it can hardly be constant, or the well known healthiness of some individuals afflicted with this deformity, and who pass into adult life, could not be maintained. The tendency, however, of these patients is to die of secondary inflammatory conditions and kidney complications. The state of hyperemia and congestion of the mucous membrane are most favourable to the existence of micro-organisms and to their extension in the urinary tract. It is due to the establishment of these micro-organisms that there is maintained a chronic inflammation of the mucous surface, from which an alkaline or feebly acid urine is discharged which deposits phosphates in such abundance as to be the greatest cause of distress to the patient and the most troublesome obstacle to successful treatment by the surgeon.

The operative measures for the alleviation of this defect I have only space to enumerate. First, there are the methods of Dr. Ayres, Dr. Pancoast, Mr. Wood, and Mr. Holmes, which aim at forming a covering for the exposed mucous membrane by turning over flaps of skin from the surface of the abdomen, and so covering the exposed surface that the urine is directed on to the urethra, and guided into the orifice of an apparatus as it falls uncontrolled from the ureters. By this proceeding the urine is made to issue from a single aperture, and further attempts to improve the shape of this opening can be made by raising a flap of scrotal tissue and lifting it over the penis to attach it to one turned down from the surface of the abdomen. Many modifications of this plan have been followed by myself and others, and it is impossible to give outlines for the direction of the incisions, as they must be adapted to the requirements of each individual case, and tissue must be drawn from the parts where it can best be spared, and where resulting cicatrization will be least harmful. I have found that the skin of the prepuce, which is usually redundant, can generally be made available to cover some part of the aperture.

It is remarkable how tolerant of operations are the subjects of this deformity. I have on several occasions removed the testes or ovaries on both sides with large hernial sacs as a preliminary to the plastic operation which has been performed at a later date. But notwithstanding these facts the proceedings are very disappointing as regards ultimate results. Complete covering is rarely obtained by one operation, and small apertures require to be dealt with by subsequent manœuvres. Trendelenburg in one case operated ten times, and one of my cases has been at least six times under my hands. The disappointments met with are due to the persistence of small openings caused by the permeation of urine through the edges of the united flaps, which it is very difficult to close. But the greatest drawback to success is due to the septic condition of the urine and the large quantities of phosphatic material which it secretes. Sometimes this will accumulate to such an extent as to form considerable calcareous masses. A child for whom I succeeded in making a very fair covering for the bladder requires every few months to have one or more of these masses removed. The hairs, too, which grow from the overturned flaps of skin become hypertrophied and form nuclei upon which these concretions collect. Distressing as this condition appears to observers, it must be borne in mind that many subjects of this deformity are in other respects strong and healthy and live to a good age, and personally it is only in the most urgent cases that I am inclined to propose an operation which is not without risk, entailing long confinement and many subsequent procedures, and which at best may afford but little alleviation.

Other methods have been tried, such as that recommended by Mr. Simon, of establishing a fistulous communication

between the ureters and the rectum or removal of the mucous membrane of the bladder, and planting the ureters in the gutter of the penis or in the rectum; but the mortality after these proceedings is very heavy, mainly in consequence of inflammation spreading up the ureters and causing an acute septic interstitial nephritis. Trendelenburg and others have sought by dividing the sacro-iliac synchondrosis, which should be done before the fifth year, to narrow the interval between the pubic bones and to approximate the margins of the exposed bladder and then suture them together. Mr. Makins has published¹ an account of this operation which he performed upon a boy aged 5, and which was fairly successful. In the same way, when the ureters are healthy, I believe that much assistance might be gained by temporarily maintaining a catheter in each, and so preventing the urine from coming in contact with the mucous membrane or with the edges of the united surfaces.

A mode of operating which seems to promise greater success is that suggested by Mr. Milton, of Cairo, and which is described by Mr. Anderson.² This consists in dissecting up flaps of the mucous membrane of the bladder and urethra for about half an inch from without inwards, and uniting them by a double set of sutures over a large catheter. Two marginal skin flaps are then dissected up from without inwards, and tension being relieved by two lateral incisions, their edges are brought together over the closed bladder by means of wire sutures and harelip pins.

Lastly, I must not omit to mention the ingenious suggestion offered by Mr. Reginald Harrison, who removed the left kidney from a boy aged 15, and eleven months later attached the upper end of the right ureter to a wound in the loin. The urine that issued was neutral and free from the tendency to form phosphatic deposits which existed when flowing over the surface of the bladder.

EPISPADIAS.

Epispadias is not a frequent deformity, and may exist independently of any defect of the abdominal walls, and be confined only to that portion of the urethra which passes through the glans, or may extend backwards into the spongy portion of the canal. But since behind both these parts there exists more or less sphincter power, the results are not so distressing as in the more pronounced form, where the opening extends backwards to the prostatic region, although the bladder and the symphysis pubis may be normally formed, as in hiatus vesicæ the great obstacle to success is the constant and uncontrolled discharge of urine, although in these cases there is not the same tendency to phosphatic deposit owing to the normal and protected condition of the bladder. I have once attempted to remove this difficulty by draining the bladder through a perineal incision, though in this instance the result was disappointing.

Time does not permit me to describe the various plans which are recommended for the remedy of this defect, but by far the most practical suggestion is that recently described by Dr. Cantwell in *Annals of Surgery*, 1895. The patient should be at least 10 years of age. The bladder is first drained through a perineal wound. When this is established, two parallel lines of incision are carried down between the mucous membrane and the skin from the symphysis to the end of the glans, joining above the bladder opening. A flap is then formed of the whole urethra from the glans backwards, and this being held up the cavernous bodies are separated. The urethral flap is then laid in the gutter thus formed, and held in position by two sutures through the mucous membrane and the skin, and tied on the under surface of the penis. A silver catheter is then laid in the urethra, and a canal formed by continuous suture of the free edges of the mucous membrane over it. Above this the corpora cavernosa are brought together and reunited by a continuous suture. The skin flaps are joined over this, and a few stitches passed through the fat of the mons veneris. Mr. Clutton informs me that he has had three most satisfactory results from this plan.

In a very complete monograph³ Dr. J. W. Ballantyne has drawn attention to that very rare malformation, so-called epispadias in women, of which he has collected thirty-three recorded observations. "It consists in the absence of a greater or smaller part of the anterior urethral wall, with the division of the clitoris into two parts, and the presence of a median gutter or groove in the region of the anterior commissure of the vulva; the symphysis pubis is normally closed, and so is the anterior bladder wall. In its least marked form the urethra simply opens above the clitoris instead of below it, but in all the other forms there is splitting of the clitoris, and the existence of a median furrow. Palliative treatment consists in the wearing of a urinal;

radical methods are found in plastic operations for the lengthening and narrowing of the urethra, and for the restoration of the anterior vulvar commissure and clitoris."

HYPOSPADIAS.

Hypospadias is a fairly common defect, and varies greatly in its degrees, and examples are frequently met with in which the opening of the urethra may be situate at any point between the perineum and the spot at which the frænum is attached to the body of the penis. The two chief points of interest in regard to this deformity are, as to the possibilities of procreation, and the question which not infrequently arises in extreme cases as to the sex of the individual. These I must not discuss, but must limit myself to the question only of its effects on the urinary apparatus.

There is, even in those cases where the orifice is in the perineum, a power of control, since the opening of the urethra is always in front of the membranous portion, but such patients are unable to micturate except in a sitting position, and an operation is necessary in order to direct the urine to a point nearer to the end of the penis. The most usual position for the opening of the urethra is just behind the attachment of the frænum. It is generally extremely minute, and many cases have come under my notice in which it has been declared that no opening existed, a state of things which is almost unknown. The minuteness of this opening, at whatever position it is situate, may lead to difficulty in passing water, and in some cases that I have seen the orifice has become so obstructed by mucus and dirt as to cause pain and delay, and in one instance a gleet discharge. This trouble is easily remedied by opening the urethra for a short distance, and attaching the lappet-like flaps by stitches to the skin on either side.

I have in several cases been able to trace a hereditary transmission of this defect, and Mr. Lingard⁴ relates an instance in which it was traced through six generations, and tells of a case where it was transmitted by the widow of a hypospadian to four sons by a second husband who had no such deformity.

CYSTITIS.

A chronic catarrh of the bladder occurs from the presence of calculus or tumour or any cause inducing urinary retention, but an acute state of inflammation rarely arises spontaneously. But there occurs occasionally what has been named an "acid purulent cystitis," to which my notice was first called by Mr. Treves. The affection has been studied and described by foreign authors. Some years ago Clado directed attention to special rod-like organisms, associated with pus, which have since been identified as the bacillus coli communis, and it has been shown by Professor Schmidt and others that their passage into the bladder induces cystitis. The anatomy of the parts, as first insisted upon by Dr. Escherich explains the greater frequency of the condition in girls than in boys. Trumpp brings forward 29 cases which were under his own observation, 21 were girls and 8 boys, the youngest was 5 weeks and the oldest 9 years. He divides the cases into trivial and grave. In the former the symptoms are principally local and in no way affect the general health of the child. Ten were of this nature, three of them suffering from vulvitis at the same time. In the graver form rapid emaciation takes place, and severe local and constitutional symptoms manifest themselves. Apathy, somnolence, collapse, and vomiting are associated with strangury, hypogastric and lumbar pains, and in two of his cases pyelitis, uræmia, rapid emaciation, and death. The urine in both types is offensive, acid, and albuminous, with varying quantities of pus, leucocytes, and epithelium, according to the severity of the attack. It is usually of a pinkish or opalescent colour, and on bacteriological examination the bacillus coli is readily found. In severe forms the deposit may amount to half the total bulk of urine passed. Mild cases recover, on an average, in two weeks.

TUBERCULOUS ULCERATION OF THE BLADDER.

Tuberculous ulceration of the bladder occurs much more frequently after the age of puberty than before, but I have met with a few cases in children, and there are records of others. The diagnosis presents even more difficulty in children than in adults, and the question of most vital

importance as regards treatment, but which is at the same time most difficult to determine, is, whether the ulceration commences primarily in the mucous membrane of the bladder, or is secondary to disease in some of those organs which communicate with it. In the case of the testes or vesiculæ the primary focus is readily manifest, but in the case of the kidneys it is not so easily determined.

The diagnosis from calculus is not usually difficult, one pronounced feature being that in tuberculosis the frequency and pain of micturition are as great or greater during night, whereas rest allays and diminishes these symptoms in cases of calculus. The amount of hæmorrhage as a rule is slight, but may be excessive if ulceration is extensive or deep. In renal tuberculosis the urine remains acid, but when the bladder is invaded it usually becomes alkaline with the increase of purulent discharge. Reliance cannot be placed upon the absence of the tubercle bacillus from the urine, but when present in large numbers it indicates extensive disease.

I agree with Mr. Battle in preferring the application of chloride of zinc, which is so efficacious in the treatment of tuberculosis of other parts, to the use of the actual cautery. Mr. Cheyne believes that much of the benefit of this operation lies in the rest which is given to the bladder by the drainage of the viscus. The plan of injecting iodoform and other compounds has not proved satisfactory, although Professor Landerer claims value for the injection which he prescribes composed of balsam of Peru, sodium chloride, and other drugs.

TUMOURS OF THE BLADDER.

Tumours of the bladder occur but rarely in childhood. Mr. Targett⁵ groups together all the polypoid growths attached to the mucous coat of the bladder in children, which are described as mucous polypus, fibrosarcoma, fibromyxoma, myxosarcoma, and the like. He allows that the vast majority of primary vesical growths of children are of the polypoid type—that is, rounded elevations of the mucous coat, with more or less constricted pedicles, and arranged in clusters, and maintains that the minute structure of these formations is of subsidiary importance, that pathologically they are best considered as members of one group, and that clinically they have one common character—namely, that they are uniformly fatal, though death is chiefly, if not entirely, due to urinary obstruction and its backward effects upon the kidneys. The growths may extend in the substance of the mucous coat, into the muscular tissue of the vesical wall as secondary deposits in the cellular tissue outside the wall of the bladder, and as deposits in the neighbouring lymphatic glands. The only record of any innocent tumour is that described as a small papilloma, which was removed by Mr. Bryant in the eye of a catheter. Treatment must generally be limited to relieving the bladder of the confined urine either by a perineal or a suprapubic opening; but removal has more than once been successfully performed: thus Sir George Humphry removed, by means of lateral cystotomy and with forceps and fingernail, a fibrosarcoma from a boy, and a case of great interest occurred in the practice of Professor Billroth where, in a boy aged 12, a tumour, 8 inches in its longest diameter, 5 in its broadest, and 3 inches in basal circumference, was dissected out through a large suprapubic incision. It appeared to take its origin from the muscular coat, and had not attacked the peritoneum. It is described as principally a myosarcoma, and in some places a myocarcinoma. The boy was discharged in a month perfectly well.

RETENTION AND EXTRAVASATION OF URINE: STRICTURE.

Except from this cause retention of urine only occurs in children by reason of the pressure of an abscess in the perineum or the impaction of a stone in the urethra, which is at once readily detected by the sound or catheter. If the stone is arrested in any part of the urethra anterior to the scrotum it can be extracted with suitable forceps, or by means of an incision made directly upon it, but if it be further back, it can generally be pushed into the bladder, and can be removed later or at once by the lithotrite and evacuator. If, however, it remain obstinately lodged in the scrotal or perineal part of the urethra, it is easily removed by a median incision.

The impaction of a calculus or the opening of an abscess

into the urethra are the only causes which may give rise to extravasation of urine in young patients, with the exception of rupture of the urethra by falls upon the perineum, and the subsequent obstinate form of stricture which ensues upon that accident. The treatment of such injuries and their consequences in no wise differs from that followed in the case of adults, but considering the firmness of the cicatricial tissue which forms at the site of these lesions, the rapidity of its contraction and the speed with which destructive changes in the kidneys supervene, and the fistulæ which form, it may sometimes be necessary to resort to some extreme measure in order to avert these after-consequences.

ABNORMALITIES OF THE PENIS.

On the many baneful effects which result from an elongated or contracted prepuce I have no space to dilate, and can only allude to their effects upon the urinary apparatus. Reference has already been made to cases of hydronephrosis, which are ascribed solely to this condition, and as a reflex effect may be mentioned nocturnal enuresis and daily incontinence, and all the symptoms of calculus, including even hæmaturia. The hypertrophy of the bladder which ensues from this cause has been pointed out by Sir James Paget. The eczematous state which so often exists at the end of the prepuce frequently starts as slight urethritis in the region of the meatus, by which urination is rendered painful and at the same time frequent, and which, if permanent, causes the meatus to contract, and renders its division by the scalpel a necessity. For these and very many other reasons connected with the effects of this condition in youth and in later life, I consider that the simple operation of complete circumcision should be performed at an early age wherever complete retraction cannot easily be performed, and whenever the prepuce considerably overlaps the glans.

The urethra of girls is not often the site of any surgical affection, but Mr. Davies-Colley has described a case in which the orifice of the ureter protruded through the meatus in a girl, aged 18 months. Mr. Croft has related a case of inversion of the bladder in a girl of 14 years, and Mr. Bryant has described a case of extreme prolapse of the female urethra occurring in a girl aged 6 years. The prolapse seems to occur as the result of straining in the later years of childhood. It does not cause much trouble in micturition, but the protrusion is tender and the mucous membrane often bleeds. All these conditions must be carefully diagnosed from urethral caruncle, which, common enough in women, is found occasionally to exist in children.

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THE INFLUENCE OF LOCALITY ON THE PREVALENCE OF MALIGNANT DISEASE.*

By EDWARD NOEL NASON, M.D. CANTAB.,
Nuneaton.

THE subject matter of this paper is the result of an investigation which was begun about three years ago, and which was suggested to me by the apparently disproportionate frequency in the occurrence of malignant disease in some districts compared with others. In one locality cases of malignant disease occurred with alarming frequency, while in another locality in close proximity to the first but few were met with. Who could refrain from asking the question Why?

Before attempting to find an answer to this question I determined to make quite sure of the fact itself, and to eliminate as far as possible the elements of chance or coincidence.

It seemed to me that if the death-rate for malignant disease could be obtained for various registration areas which differed in certain particulars, a confirmation or the reverse of my impression could be arrived at. I therefore wrote to the Registrar-General, but the answer I received, though

promising some statistics, intimated that they would not be ready for some little time; and, moreover, I saw that they would embrace areas too large to be of any use for my purpose.

I then set to work to compile my own statistics for the districts in which I was chiefly interested. I have in consequence spent some considerable time in ascertaining and making a record of all deaths from malignant disease which have occurred in the registration districts of Nuneaton, Atherstone, Market Bosworth, and Ibstock during the years 1886 to 1896; and through the kindness of Dr. Nason, of Stratford-on-Avon, I have been able to obtain very similar statistics for the large registration area of Stratford-on-Avon.

A chart was prepared on which were marked the name, age, address, sex, and, where possible, the organ affected of nearly 500 cases in all. In doing this I have been able to divide the large registration areas into subdistricts and parishes, and thus with much greater exactitude to show that my impression was correct, for the large registration areas may contain two or more districts which, differing greatly both in physical characteristics and mortality from malignant disease, would counteract each other.

Taking the Market Bosworth Registration District first, I find this subdivided into Market Bosworth with a population of 6,100, and Ibstock with a population of 9,500. Each of these is again divided into a number of parishes most of which are too small to give separate statistics of any value on the result of a ten-years' survey.

Taking the two subdistricts, I find that 58 cases of malignant disease occurred in the Ibstock division while only 17 occurred in the Market Bosworth division, giving a percentage in the ten years of 0.61 in the former and 0.28 in the latter. This is a remarkable difference for two districts lying, so to speak, side by side, but it is even more remarkable that in Market Bosworth itself, with a population of 836 only, 1 death from malignant disease (carcinoma recti) was registered in the ten years, which would give a percentage of a little under 0.12.

The chief physical difference between these two subdistricts is that, as a whole, the Market Bosworth division has a much better fall, and stands on higher ground, Market Bosworth itself being 460 ft. above sea level, and having a steep slope to the west, south, and south-east. Ibstock, though 420 ft. above sea level, is still some 40 ft. below the surrounding country, and, moreover, has a small stream in close proximity, which Market Bosworth has not. The percentage of deaths from malignant disease for the whole district during the ten years is 0.48.

In the Atherstone District malignant disease is frequent, except in the large parish of Hartshill, where it is comparatively rare. The population of the whole of the Atherstone Registration District minus this parish is 13,316 with a percentage of deaths from malignant disease of 0.72 for the 10 years. The population of the parish of Hartshill is 1,485, with a percentage for the same period of 0.33. But, in reality, the difference is much more than this, when one comes to investigate the individual cases of death from malignant disease occurring in this parish. It happens that 3 of these cases had been patients of my own, and of these 2 were already suffering from carcinoma when they came from the Nuneaton district to reside, and, ultimately, to die in Hartshill, while the third, although registered in the parish of Hartshill, had lived in an outlying part of the parish close to the river Anker, where the physical characteristics were totally different from the rest of the parish.

Now, there is one most marked difference between this parish and almost all the others in the district. The parish of Hartshill, 460 feet above sea level, and 220 feet above the valley in which lie most of the other parishes, is on granite rock, and has a sharp fall in nearly all directions, and has no stream near it, except in the case of the outlying portion above mentioned. Atherstone itself, and nearly all the other parishes which go to make up the registration area, lie in the valley not far from the river Anker, which meanders through this district, is sluggish, is contaminated with sewage and liable to floods. In many of the smaller villages which lie along the banks of this stream the death-rate from malignant disease is very considerably above the average for the whole district, but the

* Read before the Birmingham and Midland Counties Branch of the British Medical Association.