Tuberculosis
of the
Urinary Bladder

A thesis presented for the degree of Doctor of Medicine, Edinburgh University, 1894,
by
William Young M.B., C.M. 1872.
9 Tay Square
Dundee
11th April, 1894.

I hereby certify that I have known Mr. W. Young M.B. & C.M.
for some years; and that he has been engaged in the practice of
his profession continuously since his graduation in August 1892.

James W. D. Laving M.B. C.M. (Edin.)
The Royal Hospital for Children & Women
Waterloo Bridge Road, S.E.

Received return

April 28th 1894

To the Chief Clerk

University Court
Edinburgh University

Dear Sir,

I enclose fee of five guineas for entrance for the degree of Doctor of Medicine. Certificate and Warrant have already been sent to the Dean of the Faculty of Medicine.

Yours truly,

[Signature]
The Dean
of the
Faculty of Medicine
University of Edinburgh

Dear Sir,

I have already
estimated my wish to be
attended as a candidate
in the degree of Doctor of
Medicine. I have already
sent in my certificates and
am now sending my thesis.

The fee of five guineas, I
am sending to the Chief Clerk of the University Court.


Yours truly

J. Young
Oct. 23, 1892
April 16th 1894

To The Dean of The Faculty of Medicine
Edinburgh University

Dear Sir,

I beg to offer myself as a candidate for the degree of M.D.
I graduated as M.B. and C.M. in August 1892. I was then twenty-two years of age and shall be twenty-four
In July next.

Since graduation I have been engaged in medical and surgical practice and for the past year as resident medical officer of the above hospital of 52 beds. I have passed the necessary preliminary examination.

The subject of my thesis is "Tuberculosis of the"
Dear [Name],

I am sorry that pressure of work here has prevented me finishing my thesis yet, but I expect to finish it in a few days and shall forward it as soon as possible. It is being written on the regulation paper.

I enclose my certificate with the thesis and the fee will they be all that are required?

I am

Yours truly,

[Signature]
I hereby certify that
the thesis entitled
"Tuberculosis of the urinary bladder" and bearing
my name was composed entirely by myself.

W. Young M.D. F.R.C.P.

April 26th 1894
I Introduction

Tuberculosis of the urinary bladder is a disease which, until recently, has received little attention. Even now there is little English literature on the subject. Surgical text-books, with few exceptions, deal with it very briefly.

Tuberculosis of the bladder is probably much more common than is generally supposed. Bourseau even speaks of it as a relatively frequent disease.

Bacteriology and the cystoscope, in the last few years, have done much to advance the study of this disease and have proved the tubercular nature of many cases of cystitis, which would otherwise have remained obscure.

It may not be out of place here to refer to the history of tuberculosis of the bladder. Cases, apparently,
of tuberculosis of the bladder are described by Douglas (1710) and Goed (1767); Bingle describes a case in 1803; John Hornby (1823) and Craigie (1830) describe cases of bladder, associated with renal, tuberculosis. Simon, in 1850, first described a case of tuberculosis of the bladder apart from renal tuberculosis. West (1878) describes its occurrence in women.

Amongst the earliest papers, in English, on urinary tuberculosis are a translation from Hausmann (1853) and the well-known paper by Thomas Smith (1872).

Amongst recent writers, British and American, on tuberculosis of the bladder are Henrick, Jacobsen, Harrison, Newman, Sev, Bryson, Picken, Bell and Patin.

In France greater prominence has been given to this subject than elsewhere.

3. Bingle: Journal de Médecine, 1803, p. 3.
Rayer (1841) was amongst the earliest writers on urinary tuberculosis and reported numerous cases in which both the kidney and the bladder were the seat of tuberculosis. In recent years Professor Rayer has devoted considerable attention to this disease, and numerous papers regarding it have appeared, written both by himself and his pupils. Amongst the French writers are Dupuy, Monod, Ferrières, Broussais, Vignemur, and Duplay. Revue de Genève has also published an important paper on suprapubic cystotomy in tuberculosis of the bladder. German surgeons also have given considerable attention to this subject. The materials for this treatise have been obtained from the writings of the above authorities, as well as from others, and more especially from the numerous cases recorded in the different medical journals and the transactions of various

Rayer. Les Maladies des Reins, 1841.
Medical societies

With few exceptions, references in the text are to works in the Royal College of Surgeons (England) library, to which I have had the privilege of access.

II. Frequency

From the few statistics to be obtained, the frequency of the occurrence of tuberculosis of the bladder is difficult to estimate. Different observers vary widely in their opinions as to the frequency of this disease. Pott and Rokitansky, amongst numeros other later observers, have considered it a rare occurrence; while Bryns, Brynon, Fenwick and others

Also have given special attention to the subject, clinically, consider it not an infrequent occurrence.

Guyon, who has had a large experience of cases of urinary tuberculosis, refers to it as "one of the most frequent localisations of tubercle." Bonnier, indeed, describes twenty-five cases (eleven primary) which, during the year 1885, came under the care of Guyon and, according to Bonnier, there are only a small portion of the whole number of cases treated in the year at the Hôpital Necker, Paris.

Of thirty cases of cystitis, Roos has found tubercle bacilli in three.

Clinically, at least it would seem to be not a rare cause of cystitis.

Reference to hospital reports, especially The Reports of St. Bartholomew's and Edinburgh Hospitals, support this idea.

In the last two reports (1887-1892)

of St. Bartholomew's Hospital. 16 cases. and on the report of the Edinburgh Infirmary (Oct. 1891-92) seven cases of tuberculosis of the bladder are recorded. (In addition to these cases are cases of genital - urinary and renal tuberculous cases, in many of which, presumably, the bladder has been affected.)

On the other hand, in 2,858 autopsies Ny'diman Heering found only 51 cases of urinary tuberculosis. \(\text{1}\) Michel, in 2505 female cadavers, found only 14 cases of vesical tuberculosis. \(\text{1}\) Willugh in 1317 cases of tuberculosis found only 12 cases of urinary tuberculosis and Recker found in 100 cases of pulmonary phthisis only two had genital-urinary tuberculosis.

Prostate tuberculosis of the bladder is less rare than is generally supposed and is, as Lynen has stated, of much more frequent.

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2. Winkel. *Year book of treatment.* 1886 p. 201
Occurrence than tuberculosis of the kidney. Vigierren (1) makes a statement similar to the latter, but points out that where the primary tubercular focus is extra-genital, the kidney is more often affected and, according to Herberg, the kidney is in these conditions affected more often than the bladder in the proportion of seven to two.

It seems not unlikely that a systematic examination of the urinary bladder in all cases of death from tuberculosis, would show tubercular deposit in the bladder to be fairly common. In a few cases (in children), which I have had an opportunity of examining, I have found one in which there was early affection of the bladder, as well as of the kidneys, apparently without giving rise to symptoms.

(1) Vigierren - Gaz de Hop. 1893 p. 688.
Tuberculosis of the bladder manifests itself under two forms:—primary and secondary.

As a primary manifestation of tuberculous tuberculosis of the bladder is probably rare; its occurrence is maintained by Fenwick, Bryan, Papet, Tinellor and Almond amongst others. Bouvier quotes fifteen cases, and a number of other cases are recorded apparently of primary tuberculosis.

Bryan states that when one of the two genital organs is found, clinically, to be affected with tuberculosis, a careful search will reveal evidence of the existence of the disease in other parts; in many cases there may be tubercular glands, e.g., bronchial or mesenteric, giving no clinical
Secondary tubercular infection of the bladder is more usual. The bladder may be affected secondarily to tuberculosis in some other part of the genito-urinary system, or secondarily to tuberculosis elsewhere.

The active cause of tuberculosis is now generally admitted to be the Bacillus tuberculosis (Koch).

But why, in certain cases, this Bacillus should locate itself in the bladder is difficult to explain.

In reference to a tubercular lesion it is necessary to consider the facts by which the Bacillus (a) enters the body and (b) spreads in the body.

In considering the path of infection it is not necessary here to do much more than mention, without discussing, the usually recognized sources, namely, inhalation, ingestion and then circulation. But direct infection of the genito-

urinary organs calls for a little more attention.
Fall of Infection -

1. Inhalation - Lungs and Bronchial glands. Of 100 autopsies in tubercular cases among children 88 1 found 76 cases of pulmonary tuberculosis. Northrup, from autopsies, shows the frequency with which the bronchial glands are the seat of primary infection. Other observers gave similar results, showing the frequency of this source of infection.

2. Digestion - Mawst and Pharynx rarely the seat of tuberculosis; intestines and mesenteric glands frequently

Woodhead in 127 cases of fatal tuberculosis in children found that, while the intestinal canal was involved only in 43, the mesenteric glands were involved in 100. Primary localization in mesenteric glands he supposed to be due to infected milk. Ashley and Wright found in 103

1 Carr - Internat. Med. May 1893 ii p 498
3 Woodhead - Archives of Pediatrics Oct 1891 p 729
4 Ashley and Wright - Diseases of Children 2nd Ed. 1892 p 175
autopsies in children dying of tuberculosis in 1787 there was tuberculosis of mesenteric glands in intestines in both, and while in the majority cases during life pointed to lung affection, in 13 early symptoms were referable to the abdomen.

3. Skin or Glands - This mode of infection is seen best in cases of lupus and dissecting warts. Penn states that in, perhaps, ninety-five out of every hundred cases of tuberculosis of lymph glands disease attacks glands of the neck, owing to the scalp, face and sinuses being parts of the body most frequently the seat of slight injuries and superficial lesions, and most exposed to tubercular infection.

4. Direct Infection - i.e., infection through the genito-urinary tract by coryza. This question has in recent years been much discussed.

@ Semn - Principles of Surgery 1870 p 469
Conheim, in 1882, first suggested this mode of infection, but states that, if ever it occurs, it is very rare. Vermeulen in 1893 supported this view of infection, stating that cases occur in which perfectly healthy men, without tubercular history in self or family, have tubercular epididymitis following gonorrhea and that genital tuberculosis attains its chief maximum in those years in which sexual intercourse is most frequent.

Fernet related two cases in which women were infected with genital tuberculosis apparently by tuberculous husbands, and also cases of two men in whom the epididymes were apparently infected from cinetir. He also mentioned similar cases of apparent direct contagion and favoured Conheim's theory.

Schubardt calls attention to two cases of a mixed infection of the initial lesions of syphilis and local tuberculosis. In the one case he found a chancre on the penis and a tubercular enlargement.

- Conheim - cit. Fernet.
of the testicle. He was able to demonstrate the tubercle bacilli in the chains.

In the second case he found in the vagina of a young girl, the mistress of a tubercular man, a number of soft sores and an addition a tuberculous of the inguinal and pelvic lymphatic glands. Tubercle bacilli were found in the ulcers.

The author also reports a case followed by tuberculous of the epididymis of both sides, with subsequent formation of fistulae.

The examination of the pus revealed the presence of tubercle bacilli.

Tubercle bacilli were first demonstrated in vaginal discharge in case of genital tuberculosis in 1883 by Raber, and have since been demonstrated in the semen as well as in the urine of tuberculous patients.

Ford in 1892 found, in a case of genito-urinary tuberculosis, the semen in the seminal vesicles swarming with tubercle bacilli.
Petit considers the presence of tubercle bacilli in vaginal secretions a possible source of infection to the male in coitus. Demille, in eight cases of genital tubercle, in women found bacilli in the secretions from five cases and on examination of the husbands or lovers of these women found all had hard masses in their epididymis, which he considered tubercular. He had however no proof that the masses were tubercular.

Sloles reports the results of experimental inoculation of two guinea-pigs, one with the fluid expressed from the testicle of a tubercular subject, the other with the spermatic fluid obtained from the seminal vesicle of another tuberculous patient. In the first the result was negative. In the second fatal general tuberculosis developed.

Cornil and Sobroński in 1889, stated that they produced tubercular lesions.
Metastasis by injecting pure cultures of tubercle bacilli into the vagina of rabbits. In the following year
Oncinne stated that he had introduced tuberculous matter into the vagina of rabbits, and although he never produced
general tuberculosis, the animals always died of general tuberculosis.
In his paper on genital tuberculosis, the female Williams states that he injected pure cultures of tubercle bacilli
into the vagina of rabbits without producing any trace of tuberculosis anywhere.
Recent papers on tuberculosis of the genital organs in females, such as
those of Reiche and Williams, show its occurrence to be not so rare as was
formerly supposed.
The rarity of the occurrence of tuberculosis of the vagina and cervix uteri has
been put forward as opposing the

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Idea of infection by the genital passages.

But these parts are resistant owing to their structure and rarity of tuberculosis in these parts may be compared to the rarity of tuberculosis of the skin and pharynx.

Harrison states that a labial abscess in the female is often the initial lesion of genital-urinary tuberculosis. In such cases it seems not improbable that the tubercle bacilli have gained access through some abrasion of the external genitals.

Jacobson, who discusses infection by contact, in reference to tuberculosis testis, at length, considers this mode of infection unlikely.

Reclin and Guynem, amongst others, also oppose the idea of infection by contact. However, Williams, Foggi and Frankenburger consider that direct infection does occur.

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5. Foggi - "Traité de Gynécologie" 1892.
In some instances of genital tuberculosis.

It is held by some authorities not only that the genital organs may be infected directly but also that the bladder may be similarly infected.

A number of cases of tubercular cystitis recorded seem to uphold this view.

All the recorded cases of apparent direct infection are associated with an attack of genitourine.

On examination of pus from six cases of genitourine, Schubardt found tubercle bacilli in two. In one of these, the injections of tuberculin produced a febrile reaction; in the other cases, tubercular affections had been present for some time. The author maintains as a result of these examinations that a new form of tubercular infection is to be recognised, that of a "tubercular surface extension," unaccompanied by the formation of tubercles or other tissue changes. These may disappear spontaneously, and even in the later stages remain confirmed.

Schubardt — loc. cit. supra.
to the epithelium. He gives the name "gonosomal tubercular cutaneous."
The large number of recorded cases in which there is a history of gonorrhea is noticeable. But that relative the tubercular cutaneous lesion to the attack of gonorrhea is difficult to decide.

Prof. Keyes has observed that gonorrhea is especially influenced in its duration and propagation by the tubercular diathesis.

Whether it is that the gonorrhea lights up a latent tuberculosis, as considered probable by Keyes, who refers to the large number of cases of tuberculosis in the prostate-vesical region occurring in young men and boys who never had gonorrhea and never had injections, nor had a catheter passed, or whether, in some cases at least, it may be a second infection, the possibility of which is shown by Schubardt's observations, it is difficult to say.

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1. Guyon - Annals de l'Acad. med. 1856
2. Byeon - loc. cit. supra.
Rousang was able to produce tuberculous cystitis only by direct inoculation or by making a pure culture of tubercle bacilli act on an inflamed bladder, of which the urethra was tied six to twelve times.

Cayla's experiments, on the other hand, failed to produce tuberculous cystitis and he concluded from them that direct infection of the urinary mucous membrane was impossible.

In one of his experiments, he introduced a pure culture of tubercle bacilli into the bladder of a guinea pig and seven weeks after, although flakes were found in the bladder contained bacilli, there was no lesion of the bladder.

Senn quotes Strumpell as having, from a careful examination of four cases of primary tuberculosis of the bladder, concluded that infection came from without and considers this mode of infection probable in some cases.

1. Rousang — loc. cit. supra.
2. Cayla — op. cit. quem. loc. cit. d'aprés 1887.
Boussier puts forward cases of tuberculous cases of the bladder in little girls, as opposing the notion of direct infection.

Certainly a number of cases in girls and boys are recorded (seventeen under 15 year of age are referred to in this paper) in which direct infection appears impossible.

But these cases do not prove that the bladder may not be directly infected for reasons in some cases.

Fenwick, in opposing the theory of infection by contact, quotes the case of a man, in the last stage of urinary tuberculosis, who procreated a son without infecting his wife, while the baby born after birth showed signs of tuberculosis.

If direct infection of the genito-urinary tract does occur, one might expect to find the penis and urethra more often the seat of tuberculosis. The rarity of tuberculosis of these parts may be explained, as in the case of the cervix.

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1 Boussier - loc. cit. supra.

2 Fenwick - Catt. Syph. of Urinary Sys. p140.
uterus and vagina, by their structure.

According to Reclus, the urethra may be the primary seat of tubercular granulations and Starzynski found grey granulation in the urethra near the neck of the bladder.

Recorded cases of tubercular ulceration of the glans penis are rare, but cases are recorded by Krause and Malcuit, in the latter however opposite ulceration had probably spread from above.

Bryson, who believes tubercular ulcer of the penis to be more common than is generally supposed, considers that primary infection through a healthy urethra is improbable, unless by aid of unclean instruments, injection, etc., and the fact that tubercle bacilli do not multiply in the urine and are non-motile both oppose the idea.

That direct infection of the genito-urinary tract is possible is shown(1) by the presence of tubercle

(2) Starzynski. - Berlin.
(3) Bryson. - loc. cit. supra.
Canthi in vaginal discharge and in the semen and urinary in some cases of tuberculosis and by the experiment of Cornil, Dobrolynsky and Pressing giving rise to local tuberculoses by the injection of tubercle bacilli, several into the vagina and into the bladder.

From a comparison of the various cases recorded and of the experience of different authorities it seems probable that, though rarely tuberculosis is, in some cases, transmitted directly to the female urinary tract.

3. Heredity. - In cases of tuberculous heredity appears to play an important part. Baumgarten considers heredity the prime source of tuberculous infection.

On the other hand, in 1000 cases of pulmonary tuberculosis of Philip, found that in at least 70 per cent. of cases the family history was free from

tubercular taint.
The majority of observers have however
found a tubercular family history in a larger proportion of cases.
Two views of heredity are now held
one that the tubercle bacilli
are transmitted from parent to
child, the other that a predisposition
is inherited.

According to Baumgarten, hereditary
infection may occur in three ways:—
(a) infection from the mother by the
passage of bacilli through the placenta
(its possibility of which has already
been experimentally proved);
(b) infection of the ovum from the
maternal tissue or fluids; and
(c) infection carried by the fruiting
spore.

Enderszy maintains that in-
herited bacilli may remain latent
for a varying time, and not only

1. Baumgarten, loc. cit. supra.
are scarcely inherited, but the child may also inherit a constitutional taint from either parent.

Brock-Hirschfeld reported a case in which a child was removed at seven months from a mother, dying of general tuberculosis, and died without being resuscitated. Tissues of the organs of the child transplanted into three animals produced tuberculoso all.

A number of cases of congenital tuberculosis have now been recorded and recently Goldschmidt has added three more cases to the number.

The often and more generally accepted view is expressed by Zuck in the following way:—"Inherited (acquired) predisposition must be regarded rather as a diminution of the power of resistance inherent in the tissues to the action of the specific disease,

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than any characteristic cell deposit.

Localization of disease - It is
sometimes seen that the same organ
is the seat of disease in different
members of a family. Whether this
is merely a coincidence or whether
it is due to some hereditary defect
is difficult to decide.

In reference to disease of the bladder
the following are interesting examples
of this question: - (1) Morgan, she has
found, in families, in which there is a
tubercular history, a tendency in
several members to irritability of the
bladder, mentioning a family, in which four
children all suffered from incontinence
of urine.

(2) Recently, I have seen in the Royal
Hospital for Children and Women,
London, two children with bladder
affectations whose histories illustrate
the irritability of the bladder in

(1)

certain families. In each case there was a tubercular family history. One case was that of a girl, E. C., aged 7 years, in Dr. Wheaton, who suffered from an obscure and obstructive cystitis with nocturnal incontinence: her brother, aged 4, suffered from incontinence of urine sometimes in the daytime, always at night; her mother had been troubled with incontinence in childhood and suffered sometimes even now, at the age of 25, from incontinence.

In the case was that of a boy, aged 4½ years, under Dr. Jackson; he suffered from severe cystitis with haematuria, possibly tubercular: his brother, aged 9 years, suffered from great frequency of micturition and had long suffered from nocturnal incontinence: another brother, aged 2½ years, who had his hips exercised, had nocturnal incontinence, but possibly from night blindness.

Whether or not the other members of the families above referred to have cystitis along with the incontinence I have not had an opportunity of discovering.
Spread of tubercular infection:

1. By the blood stream. The tubercular virus probably reaches the bladder most often by this route. This view is supported by the sub-intestinal position of the tubercular granulations.

2. By direct extension, e.g., from uterus.

3. By the vesical passage.

4. By the urine, i.e., from kidneys and ureter.

5. By the lymphatic stream, e.g., from the peritoneum.

Tuberculosis of the bladder is more often secondary to tuberculosis of the genital organs than to tuberculosis of the kidneys; and in fact the genital organs are more often affected with tuberculosis than the kidneys.

The observations of Guyon, both clinical and pathological, show that urinary tuberculosis is more often combined genito-urinary than urinary alone. Heberden, pathological, observations are

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Similar.

Of 222 cases of genital and urinary tuberculosis observed by Suyver, 140 were isolated genital tuberculosis.

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\begin{align*}
74 & \quad \text{testis} \\
106 & \quad \text{combined genito-urinary}
\end{align*}
\]

Of 21 autopsies, in 11 the urinary tract was alone affected, in 27 both genital and urinary tracts were affected.

Similarly, of Huber's 21 autopsies in cases of urinary tuberculosis in 31 the genital tract was affected as well as the urinary.

In the male, owing apparently to the close anatomical relation between the urinary and genital organs, the vesiculae forming the common outlet for both systems, and to the frequency of genital tuberculosis, tubercular infection appears to arise more often from the genital organs than from the kidney, most often from the seminal vesicle.

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1. Suyver. loc. cit. supra.
2. Huber. loc. cit. supra.
* According to Lacassagne and Bujon, and the epididymis, according to Tumelin and Asnje.

Kypriaki, quoted by Reclus, found in 15 post-mortem examinations in cases of urinary tuberculosis the prostate affected in 14.

In the female, the genital and urinary tracts are two separate systems, and genital-urinary tuberculosis can only be, as Oppenheim states, 'the result of a simultaneous infection of both systems, or of the formation of fistulae between them, or of the introduction into the vagina of tubercle bacilli which have escaped from the urethra, or vice versa, or, lastly, by the infection of the peritoneum by the tubercular process in the bladder, from which the tubes are in turn affected, and none of these conditions are of frequent

1. Lacassagne - Ann. de Mal de Org, p. I 1853
2. Tumelin - Med. L’Acad. p. 1892
3. Reclus - Traite de Chimie, 1872, p. 781
occurrence.

The female genital urinary tuberculosis is generally admitted to be rare. Heiberg collected 13 cases of true genital tuberculosis in women. In 45 cases of genital tuberculosis, Retzius found only one case of genital urinary tuberculosis. Schramm had seen only one case in 22 years.

William's states that, according to Oppenheim's statistics, its frequency in women as compared with men as being in the proportion of one to three.

The rarity of genital urinary tuberculosis in the female as compared with the male is explained by Harrison as being due to the mildness of attacks of genitourinary in the female. He considers that in tubercular subjects, protracted genitourinary and its complications, more frequently than all the other causes put together.

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3. William's. loc. cit. supra.
determines the deposit to some part of the urinary tract from which it slowly spreads to other parts of the system. Women, though they suffer from gonorrhœa, do not do so in the same way or to the same degree, nor are their complications of the disease so protracted or severe. Further, they are more readily cured.

Bennedincia point out that pathological anatomists, and others, tend to view the lesion in urinary tuberculosis as generally secondary to a lesion in one or other kidney, extending down the ureter to the bladder; while clinicians tend to the idea that the primary tubercular focus occurs in the lower urinary genital structures. As showing how little dependence can be put on antypoiesis, as indicating the direction of extension of the disease, he quotes 29 cases, in 21 of which vesical or renal disease connected to such an extent as to be inseparable: in one,

{1} Bennedincia - Internat. Med. Mag., 1577, p. 192-
Both kidneys were normal and the bladder much diseased; in two, the kidneys were affected, the bladder not; in five cases, the bladder was insufficient to judge from.

Hecht also states that autopsies do not show, certainly, the origin of the lesion, even though the lesion is more advanced in the kidney than in the bladder, for, he says, the evolution of tuberculoses of the bladder is imperfectly known, slower than that of the kidney, adding that the bladder is most of the first affected, with tuberculosis, in the urinary tract.

Wilks, Kossman, Calvin, Smith and Canale, amongst others, hold that the kidney is the chief source of tubercular infection of the bladder.

Kossman observes that tubercular affection of the conducting and collecting portion of the urinary tract is common and generally comes about thus: —

The primary focus is situated in the medulla of the kidney, the disease spread into the renal substance, tubular material breaks down, bursts into the pelvis and, flowing into the bladder, in its course infects the mucous membrane.

The peristaltic action, in most cases, seems to oppose this mode of spread of the disease to the mucous membrane and points to infection being carried by the blood, for, as Clotte has shown, in the earliest stage the grey granulation is seen in the subendothelial layer of the mucous membrane.

Most authors now hold that urinary tuberculosis usually follows an ascending course, the urinary tract being affected secondary to the testicle, prostate or seminal vesicle.

The bladder is often affected in cases of renal tuberculosis.

Robert found the bladder affected.

2. Roberts -- Anatomy and Renal Dis. 1853, p. 613.
in 21 of 32 cases of renal tuberculosis. Raynor describes 16 cases of renal tuberculosis in 12 of which the bladder was affected.

Of 13 specimens of urinary tuberculosis possessed by Guyon in six the kidneys were unaffected. Guyon states that he knows only one case of primary and unilateral renal tuberculosis without a lesion of the same nature in the bladder, seminal apparatus or other organs.

Le Dentu quotes Tecle as stating that vesical pain in renal tuberculosis is frequently sympathetic with bladder lesion and further quotes Tecle as holder, on the other hand, that the lesion is always due to tubercular lesion of the bladder.

In one case of Morris' there was painful intermittent, 160 times in twenty-four hours, and yet post mortem, while there was

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6 Guyon, Annals of Medicine, 1885, p. 35
8 Morris. Surg. of the kidneys.
pericapsular kidney and ureter. There was only recent affection in the bladder. And in a case of Harris, where suprapubic cystostomy was performed for severe vesical symptoms, the lesion was renal and no tubercular lesion was discovered in the bladder.

From the disappearance, also, of bladder symptoms after nephrectomy, in some cases, one may conclude that the symptoms do not always correspond to a tubercular lesion of the bladder.

In reference to spread of infection from the peritoneum to the bladder, Bayson \(^2\) has noted that, by the use of the cystoscope, in two cases, saw advancement of disease from the peritoneum under the peritoneum membrane of the bladder, one in the anterior, the other in the posterior wall. In both lesions was made out in the prostate vesical region long before lesion elsewhere.

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2) Bayson - Syphilis of Gen. Disease. (Monroe) 1893 I Part II
In women distinct primary invasion of the bladder from the peritoneum is better observed. Byssen states that he diagnosed several such cases long before tumors were found in the urine. He holds that infection from the peritoneum is much more common than is generally supposed.

He further remarks the anatomical relation of the peritoneum to the bladder. Tubercular peritonitis, being insidious and often overlooked, he advises, in all cases, examination for recto-vesical plexus for the presence of tubercle bacilli.

**Pre-disposing Causes.** In addition to heredity and causes producing cystitis, such as gonorrhoea, calculus, cold and excesses, sex and age are important factors in pre-disposing to tuberculosis of the bladder.

*Sex. - Sir James Paget.*
Referring to the diseases in children
imitating vesical calculi, and
amongst other diseases, tuberculosis,
disease of the bladder, gives the fact
that these diseases, even when not
connected with the urethra, are more
common in boys than in girls, an
evidence that the greater frequency
of disease of the male bladder is
not likely to be ascribed to the trouble
into which it is laid by disease of
the urethra and sexual organs.

As is the case with tumours and stone
vesical tuberculosis is much more
common in males than in females,
although pulmonary tuberculosis
appears to be about equally frequent
in the two sexes.

Of 258 cases collected for this
purpose (62 from the statistics of the
Edinburgh and London Hospitals,
and the rest cases recorded in
various books and journals) 200 are
in males and 5 in females. Of the whole number 77 are recorded as primary, and of these 30 are in females. These figures bear an interesting comparison to those of Albarran in vesical times. Of 381 cases collected by Albarran 336 were in males and 47 in females.

In 37 cases of urinary tuberculosis, Difeer found only 8 in females. Dairre quotes Stumpfell as stating that tuberculosis (apparently primary tuberculosis is meant) of the bladder is four times as frequent in the female as in the male.

The greater frequency of occurrence in the male sex is, however, in the case of tuberculosis, perhaps explicable by the close anatomical relations of the bladder to the genital organs and by the comparative frequency

\(1\) Albarran - Samen de la Vesce 1897
\(2\) Difere - Tuberculosis femme - Archiv de Med. 1879-1879
\(3\) Stumpfell - Int. Med. Mag. Aug 42, p. 6720
of genital tuberculosis in the male, for me see that primary tuberculosis of the bladder is not much more common, some say less common, in the male than in the female.

**Age**—It is most frequent between the ages of fifteen and thirty-five, the period at which genital tuberculosis is most common, the period of greatest sexual activity.

Of 187 cases recorded, in which the prime age is given there were:

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 15 years</td>
<td>16</td>
</tr>
<tr>
<td>15-20</td>
<td>26</td>
</tr>
<tr>
<td>20-30</td>
<td>67</td>
</tr>
<tr>
<td>30-35</td>
<td>24</td>
</tr>
<tr>
<td>35-40</td>
<td>18</td>
</tr>
<tr>
<td>40-50</td>
<td>19</td>
</tr>
<tr>
<td>50-60</td>
<td>11</td>
</tr>
<tr>
<td>Over 60</td>
<td>6</td>
</tr>
</tbody>
</table>

These figures would make the disease appear unusually frequent under the age of fifteen, more cases in children, in proportion, being recorded because of their rarity.
Figures gathered from statistics probably show the proportion of cases at different periods better.

Of 353 cases from Hospital statistics (the precise age was not given in all cases)

- Under 10 —— 1
- Between 10 and 20 —— 1
- 15 – 35 —— 35
- 30 – 40 —— 5
- 35 – 45 —— 10
- Over 60 —— 1

Compare also the age at death.

1) Tumours occur in the Bladder. Of 252 cases, collected by Albarràn, only 25 occurred under the age of 30, while 84 occurred between the age of 30 and 60.

2) Stone in the Bladder:

Of 5256 cases, Dr. Pont found 500 c.c., nearly 11% per cent. in children under 10 years of age.

Over the age of sixty and under.

(1) Albarràn. loc. cit.
(2) Pont. cit. West, Diseases of Infancy.
the age of ten, except in cases of
general tuberculosis in infants (Morgan),
tuberculosis of the bladder is a rare
occurrence.
Ashby and Wright observe that in
childhood general urinary tuberculosis is
rare; not nearly so common as in
adult life, though the bladder itself
is not rarely involved.

Infantile tuberculosis disease of
the bladder in a man sixty-six years
old; Salter and Saracé at seventy-
four; Bottrell at seventy-one.

There is a specimen of tuberculosis
bladder, in the London Hospital Museum,
from a child, aged one year, and the
occurrence of another case in mentioned
(Whitman) in a child, aged two years. The
child of urinary tuberculosis, Bryson
quotes a case of four and a half; West had a
case of four and a half, Newman and

(1) Morgan - McDermot & Gazette 1855 p. 103
(2) Ashby Wright - Diseases of Children
(5) Newman - loc. cit. supra.
Barkdenhoefer of seven and Hewett of nine.

There are also a few other cases recorded in young children, as seen in the table given above.

In some individuals the bladder appears early to be the focus resistant, as evinced by nocturnal and urge in childhood.

_Briefly, there are two varieties of tuberculosis of the bladder — primary and secondary — the one rare, the other not infrequent._

It is most frequent at a certain age and in the male sex; often there is a history of tuberculosis, hereditary or personal, and not infrequently a history of growths.

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IV. Morbid Anatomy

Tuberculosis of the Bladder has been studied from the point of view of its morbid anatomy by Rayer, Remondini, Jaffret, Gaynor, Clade and Fenwick, amongst others.

Pathological specimens illustrating this condition are to be seen in the Museum of the Royal College of Surgeons, London, and in the museums of most large hospitals.

The tubercular bladder is usually contracted, small and retracted behind the symphysis pubis. It may be reduced to the size of an egg. The cavity is frequently extraordinarily reduced in size, holding only a few ounces, or even a few drops of fluid. Rarely, the bladder has retained its normal dimensions, or is even
extended as in a specimen shown by Henrick before the Pathological Society, London.

On opening the contracted bladder it is found that the walls are very thick and may be half an inch or more in thickness, the thickness consisting in large part of the muscular coat. The muscular coat is found hypertrophied and in advanced cases is hard and sordaceous. Along with hypertrophy there is an excessive proliferation of the fibrous connective tissue. This sclerosis is one of the causes of the loss of elasticity in the bladder wall in advanced cases (Renier).

The mucous membrane is the primary seat of the tubercular lesion which presents various appearances.

The tubercular lesions are analogous to those seen in the bronchial and
intestinal mucous membranes.

At an early stage the lesions are seen in the form of granulations and later as ulcers.

Tubercular granulations in very early stages, though not seen with the naked eye may be seen by aid of the microscope, a method of examination which would probably, in many cases of tuberculosis of the kidneys and of the genital organs, show when not suspected, granulations to be present in the bladder. This was found to be so in the case already referred to (p. 7).

Sometimes the mucous membrane appears to be more extensively affected than it really is, owing to an acrimatation with mucous fluid and albumin.

The tubercular lesion sometimes take the form of minute granulations scattered over the bladder wall as in specimens shown before the Pathological Society, London.
Scattered minute granulations are found in patients carrying some intercurrent affection.

The lesion is often localized and usually on the trigone and in the form of ulceration.

The frequency of localization of the lesion on the trigone is due, possibly, to the vascular supply of this portion of the bladder as well as to its anatomical relations to the ureters, urethra, prostate and seminal vesicles.

The most frequent sites of lesion as pointed out by Bourseau are three points on the trigone — the neck of the bladder and the neighborhood of the opening of each ureter. Of these three sites, the region of the neck of the bladder is most often affected.

From these three points the lesion...
spreads over the trigone and the
rest of the bladder wall more or
less extensively.

Occasionally the tubercular lesion
is not situated in the trigone
but elsewhere. Sometimes, in the
anterior wall as in cases of Bryson
6
and Philip, more often as
in cases of Fenwick and Bolton
Bangs in the posterior wall.

Bryson considers the anterior wall
and as "not infrequent sites
of the lesion, occurring in cases in
which there is extension from the
frontoconus. In a case in the patient
there was a caseous tubercular node
at the apex of the bladder.

In the bladder as in the past
of the body tuberculosis begins in
the form of grey granulation.
The granulations are grey and
semi-transparent and may be

6. Harnois - "Canad. 1882 p. 186"
occurred in confluent
The granulations, like those in the
typical changes of tubercular granul-
ations elsewhere and lead to ulcer-
ation.
The typical appearance of the ulcer
and their formation from the
granulations are clearly described
by Reutelhöll. - "The tubercular
ulcer of the urinary bladder is a
sharply circumscribed, more or less
round, circular defect in the mucous membrane
with a dirty yellow, necrotic infiltration
of its base and edge. On close exam-
ination, this necrotic infiltration prove-
to consist of "true" tubercles, military
nodules, some grey, some cheesy,
packed closely together form the
floor of the ulcer, while the younger
and smallest granulations serve
to extend the process and are
scattered far in advance of the
wound through the health.

1 Reutelhöll - Pathological Histology. Trans. Syd. Soc. (Bart.)
1872 I p. 445.
Frenulum of the mucous membrane. Side by side with the older and mature ulcers we usually find the first beginnings of the disorder in the form of solitary grey or cherry reddish nodules, disseminated through the most superficial layer of the connective tissue of the mucosa, often again forming small clusters and clearly exhibiting a distinct central canker. The gradual and uniform extension of the growing and softening ulcers from these centers necessarily gives rise in the first place to a circular ulcer, the 'cuticular tubercular ulcer.' Several such lesions confluent form larger secondary ulcers with irregular outlines. These gradually extend over progressively wider areas of the mucous surface until at length the denuded part exceed the healthy surface in amount, the relative intact
Portion forming Ramos border between adjoining ulcer.

Mr. Fenwick distinguishes between a tubercular and "scrofulous" ulcer. The latter which has a greater tendency to become encrusted with phosphate, and is of much longer duration than the former. This is done a clinical rather than a pathological distinction.

The ulcers vary considerably in size. They may be minute and scarcely visible to the naked eye or they may extend over the greater part of the bladder wall. In a number of recorded cases, almost the whole mucous membrane has disappeared, leaving the muscular layer exposed: a condition called by Fenwick "tubercular conflating cystitis" and described by him as a form of cured tubercle.

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(2) Ibid.: Cystic Symptom of Cystitis p.148
Fenwick showed before the Pathological Society a specimen, illustrating this condition, in which the mucous had disappeared except over the trigone. Kidd also showed a similar specimen, but in this a small portion of mucous membrane remained attached in the right lateral wall. Newman and Beasley also described similar cases.

Newman showed before the Anatomical Society, Paris, a specimen in which almost the whole mucosa was lost and the muscular coat was bare over the trigone and over the whole lower portion of the bladder, with a peculiar disposition of the right ureter. The right ureter was, in its intra-parenchymal portion completely isolated, demucoused and detached, forming a projection about two

\[ \text{Fenwick - Proc Soc Med., XXVII, p. 310} \]
\[ \text{Kidd - J. med, 1885, p. 185} \]
\[ \text{Newman - loc. cit. supra} \]
\[ \text{Beasley - Lancet, April 19, 1872, p. 730} \]
\[ \text{Newman - Bull de la Soc. Anat., 1872, p. 261} \]
centimetres long, in the cyst of the bladder. Projections at the
mouth of the ureter were also seen in
a specimen shown by Chaput, Memoir
which of the same character, but
considered by Chaput as invaginates
of the mucous membrane of the ureter
into the bladder.
In cases of extensive ulceration the
ulcers may extend into the ureter
as in Kold's case, and in a case
described by Donnés, in which there
was recurrence of pain due to ulce-
ration of the neck of the bladder and
prostatic region.
The ulcers, though usually shallow,
sometimes extend deeply and may
even perforate the bladder, as in a
case of ulceration, possibly tubercular,
shown before the last named society
by Basseran. In Philip's case

② Donnés: Thèse de Paris 1886
The bladder was almost ulcerated through. Ulceration sometime leads to the formation of festulae (rhabdias). The ulcer are frequently encrusted with a phosphatic deposit which may be so thick as to be mistaken for a stone in suspicion, as in the case of Druet. Another condition resembling stone is occasionally met with, namely, in cases in which tubercles are caused by calcification. Harrison has met with several such cases.

Occasionally simple ulcers are present along with the tubercular, resulting apparently from cystitis.

Infiltration growths are described by Allanbank, in one case, as growing around tubercular ulcers and were considered by him as due to the irritation of cystitis.

Beyond a Zone of Congestion around the tubercular deposit its mucous membrane over the rest of the
Bladder wall may be normal in appearance.
Sometimes there is extensive congestion in an early stage of cystitis.

The mucous membrane is most often the seat of chronic cystitis and offers the ordinary aspect of cystitis in addition to the tubercular lesion.
It is thickened, of greyish colour, may show blackish patches, sometimes edematous and may be ecchymotic.
Ecchymosis as seen through the cystoscope are figured by Buckland and Penrick.

In the course of renal tuberculosis a cystitis may be sometimes developed which is not a tubercular cystitis and yields to treatment (Bryson).

Bryson describes a "fungous" form of tubercular cystitis, considered by English as characteristic of tuberculosis and met with by Baynes.

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1. Atlas of Cystoscopy 1893 fig. 26
2. Bryson. - Journal of Tuberculosis 1893, 311
the bladder showing no apparent granulations, but proved to be tubercular by inoculation of the diseased obtained by scraping. This form is characterised by patches seen less irregular, of vegetating and raspberry-like appearance, consisting of true fungous, bright red and bleeding at the least touch.

Vigeneron quotes a case illustrating this condition.

Microscopically, the granulations have the typical appearance of tubercular granulations—a non-vascular structure composed of small cells and giant cells, with Tuberle Tuille, and having a tendency to caseation and cavity formation in the centre.

Claude has pointed out that the granulations in the mucosa are

developed immediately under the epithelium and grow towards the vesical cavity: as they approach the surface the epithelium disappears. Around the tubercular granulation, if the accompanying cystitis is not intense, the epithelium row or less altered, forms a sort of corona around the growing portion of the granulation. Under the granulation the tissue may be normal or thickened. Clado explains the occurrence of the granulation in the sub-endothelial layer of the mucous membrane as due to the vascularity of this portion of the membrane, the capillaries forming a very close sub-endothelial network.

Pericystitis — Noel Halle

In his paper on pericystitis, calls attention to the fact that the peri-
cystitis accompanying tubercular

Halle — Ann. de Mal. de Org. 9-10. 1892. p. 904.
Regeneration of the bladder is
most often simple; the bladder
worn away inside is thickened
on its outside by a thick sub-
peritoneal fibro-fatty layer.
This compensating thickening
usually prevents the perforation
of ulcers.

Halls reports one case of multiple
ulcers of the bladder, in which the
peritoneum was adherent to the
muscular wall of the bladder by
a thick fatty layer, all the organs
of the true pelvis were fused together.
By adhesions of fibrous tissue, the
perineal vessels were converted
into cavities and along each side
of the bladder and along the pelvic
wall were masses of tubercular
glands surrounding the urethra
and hypogastric vessels and
forming a tumour. He also quotes
a case, described by Taparet, in which
abnormality at the base of the bladder
rested on induration extending back
to the wall of the rectum and causing complete adherence between the bladder and rectum.

Periostitis is not always simple but may be tubercular.

It may take the form of tubercular granulations in the peritoneum, as in cases recorded by Kormann and Bonnier, or of tubercular glands and abscesses.

Lambringe cites a case of a man with tubercle in which during life there were signs of an abscess around the neck of the bladder and at the autopsy seven stones were found in the sinuses between the bladder and the rectum, each the size of a small pea, and microscopically evidently formed from the caseation of the lymph glands. Lambringe also found enlarged glands in the same situation in another case of genito-

2. Bonnier - loc. cit. supra.
Abcesses behind the bladder were found in a case recorded by Newman and his assistant by Rayni; and in a case reported by Prescot Hewitt an abscess in front of the rectum obstructed the faeces. In a case reported by Henry an abscess formed in front of the bladder.

Abscesses may resolve by the formation of fistulae.

Fistulae may be recto-vesical (Baston and Hew), vesico-vaginal (Catulfe), abdomino-vesical and perineal (Jefferet). In the case reported by Henry both an abdomino-vesical and a recto-vesical fistula formed.

Perineal urinary fistulae are more common than the other varieties of fistulae, but only when associated with prostatic abscess as in Newley's case already referred to.

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Associated Conditions - The association and relation to renal and genital tuberculosis has already been referred to.

The kidney may be affected primarily or secondarily.

In advanced cases it is usually the seat of pyelitis nephritis, which may be tubercular or non-tubercular.

The degree of affection found in the kidney is very varied in different cases: it may be slight or extensive.

There may be merely a few scattered granulations in the cortex of the kidney or the substance of the kidney may be so extensively diseased as to be converted into a loculated sac, containing caseous debris and purulent without pyelitis or abscesses.

The pelvis of the kidney undergoes similar changes to those found in the bladder.

The ureters are also found to undergo changes in many cases: they become thickened and often indurated.
Mucous membrane is affected similarly to that of the pelvis and bladder. Not infrequently the ureter is blocked with caseous matter.

One or both kidneys may be the seat of tuberculosis. The disease often seems to extend from one kidney down the ureter to the bladder, thence up the other ureter to the other kidney.

One of the kidneys is not infrequently found to have become the seat of a hydropnephrosis, due, in some cases at least, to ulceration of the intercalated mucous membrane and blocking of the ureter.

Newman reports two such cases. The urethra, in its posterior portion, is not infrequently the seat of tuberculous ulceration, forming part of a tuberculous urethra-cystitis.

In a case recently recorded by Malecot a very rare condition is described.

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*Newman - Lecture on Syr. bl. Ureter.*

namely, extension of the ulceration to the glandular.

Primary cancer sometimes coexists with primary tuberculoses. Penwick has shown several such specimens before the London Pathological Society. A case was recently recorded in which an 800 small soft calculi were voided. In female the greater uterus is sometimes the seat of proliferating exocentric as in cases described by Ferris and in Swant’s case. Already referred to. Ferris considers these polypoid growths as pathognomonic of primary tuberculoses, but Etzler states that these growths are seen in other conditions.

The genital organs are found affected in the majority of cases in the male — seminal vesicles, prostate and testicle one in all may be affected. A affection of the genital

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3. Etzler - Ann. des Mal. de Pug. 9, p. 1886
organs may be primary, secondary, and metastatic (Bryson, Reeder, and Daffan).

The prostate is occasionally affected by ulceration extending from the bladder. More often the tuberculous deposit occurs in the form of hard nodules which may go on to caseation or abscess formation and fistulae. In some cases, as the result of abscess formation, as in a specimen in the Museum of the Glasgow Western Infirmary, the prostate is found as a distinct sac in front of the bladder.

The testicle is most often affected in the form of ephideridymitis, with nodules, caseation, abscess, or pus.

The seminal vesicles may be simply hard and nodular or may be the seat of an abscess.

In the female genital tuberculosis is rarely associated with urinary.

Heiberg reports 13 primary and 22 secondary cases of genito-urinary tuberculosis in women. In 24 of these, the kidneys, in 17 uteri, and in 6 ovaries were involved.

Outside the genito-urinary tract other organs may be found affected. Most often the glands, lungs, intestines or peritoneum.

Benguen has stated that the lungs are not often found affected along with tuberculos of the bladder.

In 30 subjects, examined clinically, Reclus Duplay found that 18 had pulmonary lesions, 14 not and state further that the statistics of Ilicien in 41 cases and of Deones in 16 autopsies confirm this proportion.

In 176 autopsies on genital tuberculosis Villard found the lungs affected only in 30 per cent, while the urinary

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system was affected in 36.6 per cent of cases.
Van Buren, while confirming Guyon's statement with regard to the rarity of association with pulmonary tuberculosis, states that tuberculosis of the intestine is more often associated with similar affections of the bladder. But this latter observation does not appear to be supported by other observers.
Tuberculous glands, especially present, and, according to Bryson, tubercular periarteritis are frequently found associated with tuberculosis of the bladder.
Although it is rare that tuberculosis of the bladder is found, post-mortem, unassociated with tuberculosis of some other part of the genito-urinary tract, it is not uncommon to find it unassociated with any tubercular lesion outside this tract.

\(\text{Van Buren} - \text{London, Mem. of Genito-urinary Org. 1854, p. 254.}\)
\(\text{Bryson} - \text{Genito-urinary Org. (Monroe) loc. cit.}\)
V. Symptoms

The symptoms of the two forms of tuberculosis of the bladder — primary and secondary — are, as far as the bladder lesion is concerned, the same. They vary usually in intensity and time of appearance according to the site, more than to the degree of the lesion, being most intense where the lesion is on the trigone and especially at the neck of the bladder. Sometimes, with slight lesion, the symptoms are intense and vice versa. The symptoms are general and local, the local being alone characteristic.

A. General symptoms — in the early stage of tuberculosis the patient often appears robust.
Usually, however, the patient is pale and emaciated. Emaciation increases as the disease advances.

Pain and sleeplessness, resulting from the disease, often give rise to an anxious, haggard expression.

Currie calls attention to the depressing effects bladder affection have on the mind of those suffering from them — "vesical pain may or may not be accompanied by appreciable organic alteration, yet there are few patients who do not receive a profound impression, almost all are inclined to sadness, melancholy and despair."

In the later stages of the disease cachexia and often anemia supervene.

**Local Symptoms.** - Gray considers these under two periods:

1. The initial period, corresponding

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to the development of tubercles without cystitis, and characterized by frequent and imperative calls to micturition and haematuria, symptoms resulting from congestion and (2) the period in which the disease has become fully established and cystitis is added to the tubercular deposit.

The symptoms usually met with are those of cystitis with haematuria—pain, disorder of micturition and changes in the urine.

Micturition is usually frequent, imperative and painful. Occasionally there is retention and even incontinence of urine.

1. Frequency of Micturition—The patient’s attention is often first attracted by the fact that he urinates more frequently than he used to and has to rise at night. Frequency is present in all cases, with rare exceptions; it is usually prominent and very troublesome.
The amount of frequency is very variable both in different cases and at different times in the same case. It varies little night and day, sometime, even, being worse at night. Micturition may be every two hours, every hour, or half-hour, or even every ten minutes, and occasionally every five minutes, as in the case recorded by Bolton-Bagnold, so that it may be almost constant.

The frequency is not always in proportion to the degree of lesion, as for example in Morris' case, where there was micturition 160 times in 24 hours, the vesical lesion was slight, the principle lesion being renal.

This great frequency is seen also in renal tuberculosis without visible

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Footnotes:


Lesion of the Bladder, as in the case reported by Harrison, already referred to.

The causes of the frequency in different cases are difficult to explain satisfactorily. According to Fenwick, the cause is different at various stages of the disease:—it is due—

1. In early primary affection to reflex irritation of submucous deposit
2. Later to cystitis
3. Later still to irritative urine from a diseased kidney
4. Finally "puriform urine stagnating from stony of the bladder."

Bonnier, in referring to frequency being greater by night than by day, states that it is not explicable by prostate congestion, for it occurs as much in women as in men, but is probably due to vesical congestion.

He quotes Laffuer as being of opinion that the intensity of frequency, so

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variable from day to day and from time to time is the same day, is explicable only by the vascular system.

2. Imperative Incontinence — In

obstruction of the bladder. The call to pass urine is very urgent. The bladder is very intolerant of even a small amount of urine and constant fluid. This reflex contraction of the bladder call can overcome the voluntary contraction of the sphincter and unless the call is immediately attended to the patient acts his clothes or the bed as the case may be. This closely resembles incontinence of urine and is sometimes called "false incontinence." It differs from incontinence in that the patient is aware of the call to urinate, while in incontinence she is not.

3. Pain — Pain is a very important symptom. In 76 per cent
of tenuric cases frequency and genito-pain are the first symptoms. It is frequently an early symptom, varies in intensity but is usually severe, especially when the lesion is situated at the neck of the bladder. Sometimes in urinary tuberculosis there is acute bladder pain without apparent lesion of the bladder. Pain may be before, during, after or in the intervals between the acts of micturition. It is usually associated with frequency and several times frequency is greatest; but in cases of advanced "obstructed" tuberculosis there is frequency without pain.

In the intervals between the acts of micturition pain may be continuous or intermittent; it is usually situated in the bladder and is of burning character, but may be merely a sensation of discomfort.

Fenwick in his paper on Vesical

(1) Fenwick - loc. cit. p. 441
(2) Fenwick - id. p. 198
In the female, dysuria or vesical pain, usually described as a "stabbing pain" and found even in cases where there is no lesion of the urethra or of the neck of the bladder.

Pain in the bladder is set up by direct pressure applied externally or by instrument.

Walking and riding aggravate the pain but not to such a degree as in the case of calculus.

The prolonged upright position also causes an exacerbation of pain.

Jaffre has observed that while the prolonged upright position leads to marked exacerbation of pain, walking seems to bring a relative calm.

The pain of micturition may be
(a) before emission of urine has begun
(b) at the moment of the first jet
(c) at the expiration of the last drops. There may also be pain after micturition.
The pain usually shoots along the urethra to mid-penis, sometimes to the tip of the penis, is often very severe and patient sometimes state that they feel as if they were being cut with a knife.

Reflux pain may also be felt in the region of the scrotum and in the bones as well as in the testicle and perineum.

Dr. Cope pain often causes them to pull at the foreskin and appear as if "milking the penis" (Harron).

Agonizing pain sometimes occurs leaving the patient, especially if a child, to cry aloud. This is well illustrated in a case recorded by Hughes of Philadelphia. — The case of a girl aged nineteen, the subject of tuberculosis osteitis, secondary to pulmonary phthisis. When first seen, she was leaning over the back of a chair suffering the worst

Agonising pain in the region of the bladder; desire to urinate was constant and irresistible, and passage of small quantities of urine gave rise to such suffering that she would shriek and almost faint."

Pain before the emission of urine has begun appears to be one of the worst sensations of many tuberculous, so that many patients dread the moment of urination and ever heave to postpone the act but the call is so imperative that they cannot delay.

At the end of urination the pain is also very severe, especially in those cases in which the last drops consist of blood.

When urination takes place every few minutes pain is consequently almost constant.

Iapetus represents the patient as
enclosed in an almost circle; if he makes efforts to retain his urine the
params are very painful; if he frequently empties his bladder the
params are very painful sensation at the beginning
and at the end of micturition succeed
almost without interruption.”

Associated with pain there is frequent
by rectal tenesmus and, in children,
prolapsus ani.

In their endeavours to pass urine
with less pain the patient often
assume a stooping position, more
or less peculant.

In some cases severe pain is associ-
ated with stiphage of the stream
of urine; this stiphage may be
voluntary or may be due to blood
clots or spasm of the sphincter
intrinsic.

The cause of pain is probably due
to spasm of the vesical neck,
which is sometime reflex, sometimes due to
when in deposit in the neck
and comparable to painful spasm.
of the anal sphincter in passage of the anus (Syrour). Extension of the bladder, with a few ounces or even a few drams, is also a cause of same possibly by setting up a spasm of the neck of the bladder. Herwick observes, as showing the intolerance of the bladder to over-tension. Retention of urine, Retention is occasionally met with. It is usually intermittent. From a case observed by himself and cases recorded by other observers I cannot conclude that it is not rarely a primary symptom of tuberculosis of the bladder. It arises from various causes:—spasm of the membranous urethra, blood clots or debri obstructing the urethra, weakness of the detrusor, weakness of the urethra from infiltration of the mucous
With tubercular granulations (Bryson), structure of the bladder and lastly, and not infrequently, from enlargement of the prostate from congestion, hypertrophy or tubercular disease.

S. Incontinence of urine - apart from the so-called "false incontinence." This is a rare occurrence, except in advanced cases.

In rare cases it is due to retention and is overflow from a full bladder. In advanced cases it may arise from cachexia, from ulceration of the neck of the bladder and prostate, or from fistulae; and Fenwick describes its occurrence in bladder after its mucous membrane has been stripped off.

It is not uncommon in subjects of tuberculous bladders to find a history of nocturnal incontinence in infancy. Infantile nocturnal incontinence is, however, common in delicate and in neglected children.

0 Fenwick: Electro-therapy of Bladder. 1884 p. 138
Conditions of the urine. - The urine in some cases is normal in appearance; usually it is done or less cloudy. In some patients it may be at one time cloudy at another clear. It is as a rule of normal specific gravity and acid in reaction, unless surgical interference has rendered it alkaline or unless the case is advanced and there is excessive vomiting of urine.

Patey states that it is sometimes markedly hyperacid.

There is almost always an excess of pus is present, and frequently a deposit of phosphate. Presence of blood and pus is characteristic. Apart from the presence of blood there is usually a trace of albumen.

The amount of urine, though usually normal, may be increased and constitute a polyuria; its specific gravity is also usually normal.
1. Haematuria - One of the most important symptoms of vesical tuberculosis, associated with frequency and pain, it is characteristic of vesical tuberculosis. It rarely occurs apart from frequency which may be developed before or immediately after the appearance of haematuria. It is present at an early period in most cases and may be the first symptom. Szyman describes it as being in some cases premonitory and comparable to the haemoptysis of pulmonary tuberculosis. Smith carries this resemblance between tuberculosis of the urinary and pulmonary systems. Membrane still further, observing that "in both there is bleeding, suppuration, increased secretion of mucus and muscular enlargement of nose and frequency of micturition in the bladder and cough in the case of the lungs."

© Smith - St. Bartholomew's Hospital Report, 1872
The haematuria is spontaneous, not disappearing by rest.
The early haematuria appears to be of digestive origin while the late is due to alteration.
It rarely lasts more than a few days; it gradually disappears and may not re-appear for a long interval.
The amount of blood present in the urine varies in different cases and at different times, in the same case; it is rarely present. Sometimes it merely taints the last drops of urine or the last drops may consist of almost pure blood.
Blood may be intimately mixed with the whole of the urine giving it a bright red colour. More often it is found, if the urine is collected in two glasses, that the first urine passed is clearer than the second and may be quite free from blood. In the same day some specimens may be quite free from blood while others are not.
Frequently, on standing, the  
clot of urine is alone blood-stained.  

Monod\(^1\) describes a case in which,  
it times, blood appeared in the  
intermals between the act of micturition.  
The patient felt a violent  
call to micturate, but after painful  
efforts passed only some drops  
of blood.

The presence of clots is exceptional (Vignes\(^2\)). Sometimes, clots are very  
minute and appear like threads  
of red cotton.

The presence of blood in the urine  
is sometimes detected only by the  
aid of the microscope.

In the later stages of the disease,  
blood usually disappears from  
the urine altogether.

2. Pyuria - The presence of  
fus in the urine is constant where  
there is tubercular cystitis. Grignon


\(^2\) Vignes - *Gaz. de l'Hôp.*, June 30th, 1893.
Describe it as "spontaneous, persistent and continuous."

This is usually present at a very early stage and is one of the first symptoms that cystitis has been set up.

It is held that in some individual susceptibility may be the first symptom, and comparable to the foremonitory symptoms of many tuberculosis.

Pus is usually in small quantities, seen as a white deposit at the bottom of the glass.

When a tubercular pyelitis occurs, pus is present in large amounts, forming a thick, mucoid, gelatinous deposit.

The greater part of the pus is usually passed at the commencement and at the end of micturition.

This between the acts of micturition, tuberculosis hematurgia is exceptional (Gayer), and occurs only where there is ulceration of the urethra (Bouvier).
3. Polyuria - The presence of intermittent polyuria in some cases is mentioned by Gaynor, Tapert, Porcier and Vigneron and it is said sometimes to be associated with polydipsia.

Polyuria may appear early in the disease and is explained as being due to reflex irritation of the kidney from the vesical lesion.

Two varieties are described, namely, clear and turbid.

The polyuria, however, cannot be considered as certain due to reflex irritation from the vesical lesion, for Robin has found polyuria of frequent occurrence in early pulmonary tuberculosis and he explains it as being due to a manifestation of the vital reaction to the bacillus and the product of its secretion. If Robin's explanation is to be accepted one could...
expect to find polyuria a frequent occurrence in tuberculosis of all organs.

**Exceptional Cases** — Although in the majority of cases the symptoms are intense, in a few recorded cases, even at an advanced stage of the disease, the symptoms were slight or unnoticed.

These cases are comparable to cases in which stone exists in the bladder without giving rise to symptoms, referred to by Hilton and Jackson.

In Philip's case, in which the autopsy revealed small erosions at the entrance of the left ureter and a large ulcer in the anterior wall, the only symptom had been passage of a little clotted blood and later of shreds of material.

In the case, also of pulmonary phthisis,
published by Fred. Smith there were no symptoms of bladder trouble, and there being only a little albumen and a little pus in the urine, and yet post-mortem, associated with renal tuberculosis, there were found six caseating ulcers at the base of the bladder, each about the size of a threepenny piece, evidently tubercular. Also in Kidd's case of genital urine, any tuberculosis, were almost the whole of the mucous membrane of the bladder had ulcerated off, the patient during life had complained of no bladder symptoms.

In a fourth case, recorded by Rayer, the case of a boy aged 12, who died of pneumonia, there was found post-mortem extensive renal and some vesical tuberculosis and yet the boy had seemed to urinate naturally.

(2) Kidd. loc. cit.
and said: "Bryson refers to the almost complete absence of symptoms in cases where the middle coat of the bladder is primarily invaded from the blood-vascular channel. In this condition when symptoms are present they consist, according to Bryson, of:

1. Weakness of the detrusor with slowness in starting the stream, weakness of flow and difficulty of emptying the bladder.

2. Residual urine in the later stage.

3. Growing pain behind the pubes not relieved by urination.

4. Small haemorrhage from over-distension.

No frequency, no pain, nor tarry and rarely blood in the urine."

Physical Signs:

1. Palpation and percussion in the hypogastric region usually elicit pain though otherwise they are negative except in those unusual cases of distension of the bladder.

2. Examination of the external genitalia, though in the female usually of little value, is important in the male.

Jenkinson has laid stress on the presence of polyform excrescences around the urethra as a symptom of urinary tuberculosis. In the female, but Guyon has seen similar excrescences in non-tuberculous conditions.

In the male, in rare cases there is ulceration of the glans penis and exceptionally urethral discharge. The epididymis and testicle are

frequently found to be the seat of tuberculosis. Most often the epididymis is found enlarged with hard irregular nodules.

3. Examination per vaginam in women is useful as aiding exploration of the bladder. Tenderness of the bladder and pain are elicited, and often localized indentation is felt at the base.

In the bimanual examination the bladder may be felt intact and in advanced cases it is sometimes felt as a hard, tender mass.

4. Examination per rectum is, in tuberculosis in the male, the most important mode of examination both of the bladder and of the prostate and seminal vesicles. These cases in which there is no indentation of the seminal vesicle or prostate are exceptional. Exploration of the bladder per rectum reveals tenderness
and often perivesical irritation at the base.

Enlarged secreting glands are also occasionally to be felt. Thickening and induration of the bladder wall may be better ascertained by bimanual (recto-abdominal) examination.

5. Digital examination of the interior of the bladder through the rectum in the female may detect congestion or ulceration of the bladder wall.

6. Instrumental examination.

(a) The sound. — Instrumental

Even once the diagnosis is made, it is deprecated by all writers on urinary tuberculosis.

Fenwick points out the danger of frightening up quiescent tubercle and of setting up cystitis, cystitis or pyelo-cystitis, or endangering the life of the patient.

In sounding, through antiseptic precautions are requisite to minimize the dangers.

Often the sound is arrested in the passage by spasm of the urethral sphincter. This spasm is sometimes mistaken for organic structure, but by continued pressure the sound passes on into the bladder. On reaching the neck of the bladder severe pain is usually set up.

The bladder absence of stones is determined always pain and sometimes a certain amount of roughness of the bladder wall with usually small size of the bladder cavity.

The condition of the bladder and of the prostate and seminal vesicles can be better made out by combining with the sound rectal examination.

Pounding usually produces a flow of bright blood and for
Some time after increases the vesical symptoms. There is likely to be a marked reaction - rise in temperature and increased rapidity of pulse - after wound.

(2) The Cystoscope - When the urine is clear enough cystoscopic examination may reveal the lesion of the bladder wall. Ulcers, congestion and other appearances seen with the cystoscope are described and figured in The Atlas of Cystoscopy by Buchbade and Ferencz.

Examination of the Urine - The naked eye appearance and chemical examination of the urine have already been referred to. Microscopic examination of the urine reveals the presence of pus, leukocytes, fat globules, epithelial cells, often red blood corpuscles, phosphatic crystals, debris,
Bacteria and in most cases, if repeated examination is made, with the necessary staining, Bacilli of Koch.

_Bacilli in Wine._ In the majority of cases these are found with difficulty, though usually to be found by repeated examinations. They disappear when the wine becomes ammoniacal (Bajon). They are present only when the mucous membrane of the urinary tract is ulcerated. Their presence in the urine was first described early in the year 1883 by Lichtheim and by Friedlander. They had both discovered them post-mortem. Soon after they were found in the urine of patients by Babesiu of Death and Rosenstein of Leyden.

(1) Lichtheim — Dr. Bornzin.
(2) Friedlander — Dr. Bornzin.
(3) Babesiu — Lancet 1883 p.464.
(4) Rosenstein — Jutiam p.333.
The method of examination for
bacteria in the urine, with the micro-
scope, usually adopted, is that
recommended by Paul de Gennies.

Obtain, if possible, in a conical
glass, the last part of the urine
passed. Allow it to stand for
several hours and then draw off
the upper portion of the fluid,
leaving the deposit.
Put a little of the deposit obtained
from different parts in several
slides. Dry, stain with phenol
and methylene and mount in
the usual way. More thorough
decoloration than usual is re-
quired, as to avoid the other
Bacteria.

It is usual to find only a few
bacteria, sometimes only two or three.

Where available, the centrifugal
apparatus, as recommended by
Woodhead, in the examination of

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2 Woodhead. - Bacteria & Their Products. 1892 p. 413.
Milk for Sanelli, is useful in separating the deposit of the wine. Another plan of separating the Sanelli in the krömme is recommended by Emil de Vo. - 20 pure egg-albumen and four times its volume of distilled water; a slaty precipitate is formed, consisting probably of globulin, which settles to the bottom of the vessel. About 10 c.c. of the clear opalescent fluid is decanted off and added to an equal volume of wine. The whole is thoroughly shaken and heated in a water bath to about 65° to 70° C (149° to 158°F) in order to coagulate the albumen. A keen or less opaque precipitate is thus formed which on settling carries down the Sanelli with it and the sediment may be examined in the usual way.

Formation of Wine - Where one has failed to detect its presence

of bacilli with the microscope. Inoculation of the urine into guinea-pigs or rabbits may detect their presence by giving rise to tuberculosis in the animal injected.

Dausch is reported to have made inoculations into the eyes of thirteen rabbits with the urine of seven patients with symptoms of primary tuberculosis. In all local and general tuberculosis followed.

The urine of these patients was sometimes voided in a clean condition and then it gave negative results.

Other observers also have proved the value of inoculations in detecting the presence of bacilli.

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The beginning of tuberculosis of the bladder may be quite latent and the disease may be well advanced before its symptoms become prominent. The symptoms, however, are usually marked from the first. The onset is spontaneous and the course is progressive. Jacobaeus observes that "the course of tubercular cystitis is one steadily downhill (occasionally arrested by one or two periods of apparent tranquility and latency of the mischief), and is ended by extreme painful death."

Occasionally a simple or a hemorrhetic cystitis may pass into a tubercular.

Frequently tubercular cystitis occurs...
In the course of a tubercular epididymitis, but the bladder is sometimes only involved several years after the epididymitis as in cases recorded by Jacobson, in one of which the patient had had emissions following suppuration in the epididymitis and after being seven years in Australia cystitis appeared.

The progress of the disease is usually gradual, the seminal organs in the male, if not already affected, soon being affected, and the uterus and the uterine kidneys also being invaded. Sepsis inflammations in the urinary tract are very apt to arise and carry off the patient. The disease may run its whole course without spreading beyond the genito-urinary organs. Death may follow from cachexia or from haemorrhage.

Often tuberculous spreads to the lungs.

or other organs and may become generalized, death resulting from affection outside the urinary tract.

The duration of the disease is very variable, but it is usually fatal in from two to six years.

Occasionally, its course is rapid. A case of this kind is cited by Smith. Death took place in two and a half months from the onset of the symptoms.

The long duration in rare cases is well illustrated by a case of Paget also cited by Smith, the case of a patient who at the age of 30 had suffered from tuberculosis of the bladder and prostate with seminal abscess and was alive and well twenty years afterwards.

Guyon also has had cases of tubercular cystitis with prostatic calculi leading to incontinence in which the incontinence disappeared.


(2) Guyon - Ed. Broussais.
The prognosis, then, is in all cases grave and is worst in those cases where there is evidence of tuberculosis in other parts of the body. Where tubercular cystitis arises in the course of pulmonary or other tuberculosis it adds considerably to the gravity of the case.
Diagnosis

The diagnosis of tuberculosis of the bladder is frequently difficult. It is made by the nature of the symptoms, the course and the physical signs of the disease, the family and personal history of the patient and by a process of exclusion.

The presence of Caulton in the urine, repeatedly ascertainment is a sure sign of urinary tuberculosis, although not necessarily vesical. Harris has found careful and continued thermometric observation very valuable in the diagnosis of urinary tuberculosis. He observes that in the irritability which accompanies stone and tumour in the bladder an evening rise in temperature is exceptional.

Harris. Lancet 1882 ii p186
Whilst in urinary tuberculosis, it is constantly observed.

The cystoscope is frequently useful as an aid to diagnosis. But its value is overestimated by many surgeons, for it is rarely available and its satisfactory use requires clear fluid in the bladder and special dexterity in the operator.

Whilst Albarran states that "the cystoscope is a precise resource in the diagnosis of tuberculosis," and Fernwich, Bryan, and others speak highly of its value, Pilcher writes:

"The cystoscope if, by rare chance, when it is introduced the fluid contents of the bladder are clean enough to enable its mirrors to reflect any portion of the bladder wall, can reveal but imperfectly the degenerative and inflammatory changes that

1 Albarran. — *Proeure de la Venie* 1892 p. 286.
May be present, and Malherbe considers it "far from certain always in diagnosis.

Failing other methods of diagnosis, where there is suspicion of human tuberculosis, recent may be had to inoculation experiments, the success of which are shown by the results of Bunsch and others. Jacobson has published an interesting case showing the value of inoculation. The case of a woman aged 30, who had chronic cystitis. No tubercle was found in the urine microscopically, and yet inoculation of a little of the sediment under the skin of the back of a guinea-pig was followed by the formation of caseating glands, in the groin, which contained tubercle bacilli.

This mode of diagnosis, however, requires several weeks to be effective.

Injection with tuberculin is dangerous.

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2 Jacobson - Guy's Hosp. Reports 1890.
and unjustifiable as a model of diagnosis (see 'Treatment').

When the diagnosis is uncertain and the symptoms of vesical irritation and haematuria are persistent, exploration of the bladder by a cutting operation may be resorted to, opening the perineum, passing the urethra in the perineum and inflicting the bladder with the finger as recommended by Sir Henry Thompson by performing cystotomy and exploring visually as well as digitally.

Numerous diseases of the urinary tract may be complicated by tuberculosis. Freeth says "no disease of the urinary organs is capable of such accurate diagnosis as tubercosis."

Amongst the diseases more commonly complicated are calculus, tumour of the bladder, simple chronic

1 Sir Henry Thompson - On Urethritis of Urinary Organs.
cystitis, generalised cystitis, prostatic enlargement and urethral structure. The symptoms of renal very closely resemble those of vesical tuberculosis.

1. Calculus - There are few cases which do not at first give rise to a suspicion of calculus. The symptoms of calculus differ from those of tuberculosis mainly in the character of the haematuria, pain and frequency. These symptoms of calculus are markedly affected by rest and by exercise, being diminished and relieved by prolonged rest, produced and greatly aggravated by exercise, but not in tuberculosis.

Haematuria is usually brought on by exercise and not generally by stricture as it is in tuberculosis, and usually the whole urine is tinged with blood. Pain is produced and greatly aggravated by walking and dune.
so by getting, as in riding in an empty cart. It occurs also more often than during micturition and in this differs widely from tubercular cases.

Frequency of micturition is calculous. Great and disappears at night.

Stoppage of the stream during micturition is a common symptom in calculi.

Stone can usually be sounded with the cystoscope. Calcareous deposits in the wall, resembling calculus, have already been referred to. They are immobile.

The difficulty of diagnosis of tuberculos from calculus, as well illustrated in the following case kindly communicated to me by Dr. Jacobson. Three years ago a boy, aged 13 years, suffering from pyuria and irritable bladder was under Dr. Backston Browne for stone, but no stone was found.
A year and a half later Dr. Gardiner saw the boy and found the left kidney to be the seat of tuberculous pyo-nephrosis. The kidney was removed and the symptoms improved. At present, eighteen months after the operation, the bladder symptoms are in abeyance. The patient, holding his urine for two hours and, with the tumour soundly healed, is now attending college.

2. Vescical Tumour. - The tumour may be simple or malignant. The diagnosis between tubercle and tumour may be arrived at in most cases by the spread of the tubercle and by the character of the haematuria.

In the tumour and tubercle, at the outset haematuria is spontaneous and rebellious, but in tumour it is usually not associated with frequency while in tubercle it almost always is. While absence of early frequency
is generally admitted with regard to simple tumors it is not in the case of malignant. Thompson states that in many cases of malignant tumors pain and frequency precede, sometimes for a considerable time. Ferruck and Allmand hold the converse of this to be the case, Ferruck finding that haematuria preceded frequency of urination and pain in 38 of 50 cases.

Guyon points out that pain is more severe and there are as periods of quiescence in cancer as there are in tuberculosis and in tuberculosis haematuria is less abundant than in papilloma and tends to diminish as the disease progresses, while in papilloma it increases and is as a rule without frequency of urination.

There is also an important difference

In the age of infancy the two diseases occur. While leprosy, tuberculosis, and tumour are rare in childhood, tumour is uncommon under 30 or 35, and is relatively common over 40. 127 of Altman’s 202 cases were over 40 years of age.

MacGillivray relates a case of tumour closely resembling tuberculosis, the case of a youth, aged 18, who had haematuria for two years preceding the onset of frequency and pain; no vesical erosion; there was epitheliotuberculosis; suprapubic cystotomy showed a diffuse form of papillomatous growth but no ulceration.

A case, the converse of this, resembling tumour, is recorded by Malherbe. The case, also, of a youth aged 18, in whom from time to time there was repeated severe haematuria, no tuberculous family history, predomi...
at intervals from vesical symptoms and absence of prostatic effects. Sounding was negative and the cystoscope gave the appearance of tumour. Intraprostatic cystotomy revealed the mucous membrane swollen and scattered over with yellow granulations. No trace of tumour.

3. Simple Chronic Cystitis - Absence of haematuria except in rare cases. Absence of tubercle bacilli from the urine. It also yields to treatment, generally, with local and internal remedies.

4. Gonorrhoeal Cystitis - The history of the case is also important in the diagnosis here. There is always a history of urethral discharge.

The appearance of symptoms is usually much more insidious in tuberculous and haematuria is not always terminal as it is in gonorrhoeal cystitis. Rare large quantities appear early in
gonorrhoeal not a tubercular cystitis. (Guyon).
A gonorrhoeal may pass into a tubercular cystitis.
Gonorrhoeal cystitis is usually rapidly cured by instillations of nitrate of silver. A reference to Diagrosis considers the old aphorism Naturam Secundum curat. A case of extant especially applicable here and the report of the case in which the diagnosis was made only by the result of treatment:
A man, aged twenty-three, had pulmonary phthisis, pyrexia, intermittent haematuria with frequency and had unaltered by treatment. There was slight indication of one seminal vessel considered non-tubercular. Finally the cystitis was slowly cured by repeated instillation of nitrate of silver and was considered gonorrhoeal.

5. Prostatic enlargement. Enlargement of the prostate can usually be felt per rectum but there can be considerable enlargement of the "third lobe" of the prostate without its being detected by rectal examination.

Enlarged prostate almost always occurs in men over 50 years of age. The symptoms are very gradual in their onset and difficulty of urination and retention come very early in the case. Frequency at night is an early symptom, but with it there is residual urine, which is rarely observed in tuberculosis. Haematuria is present and is sometimes severe.

Bayson calls attention to the resemblance to prostatic disease in those cases where the lesion is on the anterior wall of the bladder.
and relates a case, in a man aged 55, where the symptoms pointed to prostate enlargement. No trouble could be found in the urine; there was difficulty in starting urination; the stream was feeble and there was no residual urine. There was no enlargement of the prostate or seminal vesicles. The cystoscope showed a tubular lesion in the anterior vesical wall. Later, calculus were found in the urine.

6. Organic structure of the urethra—It is not often that the symptoms of tuberculosis give rise to a suspicion of stricture, but sometimes a disease arises in sounding from the instrument being arrested in the membranous urethra by spasm of the urethral sphincter.

This obstruction when not due to organic stricture is overcome by continued pressure of the instrument.
In structure moreover there is always a history of gonorrhoea or accident and of the stream becoming gradually obstructed. Cases of tuberculosis are nevertheless recorded which have been treated as cases of stricture. Bonnier states that Guyon has seen cases treated by internal restructuration and Monod relates a case which closely simulated stricture and was treated with longies for three months. The longies caused formation and aggravated the condition. Later the man saw Guyon who found no stricture and diagnosed the case as one of pyostitis.

7. Renal Tuberculosis: Having excluded all other conditions and diagnosed primary tuberculosis it is often difficult to decide whether the lesion is vesical or renal. Frequently both coexist. Vesical symptoms

1. Bonnier - Hors de Paris 1856
2. Monod - Le Progès Médical 1879 p619
are prominent in renal tuberculosis and sometimes without vesical lesion as seen in Harrison's case, previously alluded to.

Le Dentu also discusses the cause of the vesical symptoms in renal tuberculosis, giving the following case in which the diagnosis was very uncertain: a youth aged 17 had been treated by Felixer for tubercular cystitis, and a year later came under Le Dentu's diagnosis of tubercular nephritis along with cystitis. After two months of local and general treatment the symptoms had greatly improved and the patient went away to the country, returning late apparently in good health without vesical symptoms.

Usually there is a large amount of pus in the urine of supposed case. There is renal lesion.

Typical examination of the bladder.

and kidneys is the chief method of diagnosis. Pain in the lumbar region together with tenderness and swelling point to renal affection.

In cases of renal tuberculosis it is, apparently, rarely possible to say definitely, clinically, that there is no tubercular lesion in the bladder.

**Site and extent of lesion** - It is important to determine not only the presence of tuberculosis of the bladder but also the site and extent of the lesion and the condition of the prostate, testicle, kidney and other organs, for on these depends the treatment. Here the physical signs are the principal guide.
Treatment

The question of treatment of tuberculosis of the bladder has been greatly discussed of late years. So few diseases have so many drugs been used with such little permanent effect.

Even surgical interference, although cystotomy usually gives immediate relief, has not met with much better ultimate results.

The "radical cure" by suprapubic cystotomy and destruction of the tubercular lesion, strongly urged by Guynon in 1885, has met with only limited success. Guynon now equally strongly urges the use of instillations of perchloride of mercury for the cure of tubercular cystitis.

The results obtained by different modes of treatment are frequently
Repetitive because the disease is of itself subject to attacks of suspension. Treatment may be (A) prophylactic or (B) remedial.

A. Prophylactic. The frequency with which tuberculosis of the bladder follows an attack of genitourinary could suggest the early and careful treatment of genitourinary, preventing its spread to the bladder, as possibly diminishing the likelihood of localization of tubercle in the bladder.

Early and radical treatment of tubular epididymitis probably prevents or delays the spread of tubercle to the bladder. The spread of disease from the epididymitis is probably large due to the way in which the surgeon holds his hand (Jacobson). In the manner in relation to tubercles of the kidney the results obtained by nephrotomy
and nephrectomy, as published by Virgenu, point to the value of early surgical interference in renal tuberculosis as preventing or retarding the spread of disease to the bladder.

B. Remedial. — (1) Medical and (2) Surgical

1. Medical. — The indications for medical treatment are to improve the general health and treat the local symptoms. In all cases whether surgical interference is adopted or not the general health of the patient requires attention. Give tonics and strengthening medicines, cod liver oil, malt, quinine, arsenic and iron in its different preparations. The patient should wear warm clothing, avoid exposure to cold and have as much fresh air as

Virgenu — Gas. des Hôp. 1893 p. 693
Sea voyages and change of climate are of the utmost importance in improving the general health and aiding the treatment of the local lesion.

In reference to sea voyages, it is necessary to choose a voyage and time of year in which there is not likely to be long exposure to great heat or severe cold. I know of one case of cystitis, probably tuberculous, in a boy, in which the symptoms were greatly aggravated by a voyage in a sailing vessel round Cape Horn in the winter time.

A long sea voyage should not be undertaken when the disease is advanced.

The value of climatic treatment is well seen in a case of tubercular cystitis associated with genital and pulmonary tuberculosis, reported by Alexander, in which...
As shield the vesical symptoms disappeared, and in the cases cited before the New York Academy of Medicine in November 1893. Having found a suitable climate the patient should remain there as long as possible; I recommend at least seven years.

Attention to diet is important. Where the symptoms are acute or severe milk and barley water alone should be given. The diet should in all cases be light, avoiding butcher meat and condiments as far as possible. Alcohol in all its forms is in general indicated. When it becomes necessary to support the strength of the patient with alcohol, champagne appears to be the least irritating form of alcohol. In one case of vesico-urinary tuberculosis, under Dr. Jackson, I ob-
served the frequency and pain diminish. While the patient was taking champagne (3/4 daily), the bowel must be kept open, laxatives being used if necessary. Much exercise is to be avoided, but rest in bed is necessary only where the symptoms are severe or acute.

Koch, Gynt: The use of Koch's Gynt (Tuberculosis) in genito-urinary tuberculosis is deprecated by all writers on the subject. From an observation of 46 cases of genito-urinary disease treated with tuberculin Kelly states that the results were not satisfactory and in 3 cases of renal tuberculosis the symptoms set up were dangerous (the 46 cases include 14 cases of tuberculous cystitis).

Gynt treated two cases of tuberculous cystitis with tuberculin and

Fenwick one of renal vesical tuberculosis, all of which were aggravated and the last died two and a half weeks after the injection of tuberculin.

**Drops.** — Opium is the most remissible; it may be given by the mouth, in the form of morphia hydrochloridically or in rectal suppositories. It soothes the pain and diminishes the irritability of the bladder. Suppositories appear to give the best results. Morphia or Opium may be given in suppositories alone or with other drugs, as in the following prescription:

Int. Belladona, Ext. Opium æq. gr. 1/2,

Strychn.æq. gr. 2/3, Cinaeæq. gr. 15, Oel.

Hebromæq. gr. 40, H. Pepper.

Most of the patients are able to bear comparatively large doses of morphia and owing to the relief obtained it is not unusual for

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them to gain the dormia habit.
Belladonna, hypogynium, bromide, and chinal appear to be less effective as sedatives.
Ammonium, ammonium bicarbonate, and arsenic and salol, boric and benzole and
guaracin, creasote and iodidum.
Sometimes, these, especially sandalwood, came temporary improvement.
Brenner, while speaking of the value of salicylic acid in some cases of
chonic cystitis, states that it is distinctly harmful in tuberculous
cystitis.
2. The haematuria of tuberculous
braziline and ergotin are as a rule
of little use.
Fenwick recommends a medicinal
treatment sandalwood oil and
rectal suppositories twice daily.
2. Surgical – Careful anti-
septic precautions are necessary.

The dangers of injudicious treatment are great. The chief dangers are, 
lighting up quiescent tubercles or 
improving the rapidity of its spread. 

Fenwick reports that he upstaged 
the bladder in two cases of contracted 
bladder by instillation. He con-
clused that it is best to leave fully 
contracted bladders alone and adopt 
a good warm while modifying the 
acidity of the urine with drugs.

Surgical treatment may be 
(a) Biopical or (b) Operative.

Biopical—Remedies may be 

applied to the interior of the bladder
in the form of washes or instillation.

Fenwick states that he has found 
washing out the bladder with 
boiled water relieves pain and often check 
bleeding in the early stages.

Among the numerous local applica-
tions used are perchloride of mercury, 
muriate of silver, coloform,
Sodium, formic, and pepsin acid, acetic acid, lactic acid (Kunick),
sulphate of lime (Monod), salicylic acid (Bennett) and simple sedatives
— opium and cream.

The best results have been obtained from perchloride of mercury, nitrate
sulphate and calomel.


Perchloride of Mercury. — Guyon(2)

recently introduced its use into
the treatment of tubercular
cysts and instillations, have
in his hands met with good results.
In the 10 cases reported by Guyon
the instillations were always well
borne. 2 were greatly improved
and apparently 'cured,' and one
of these seen ten months later was
in good health; 3 were greatly
improved, 3 slightly improved
and 2 had obtained relief from
sain.

Vigneron's state that a continued experience of Gau's instillation only confirmed the value of mercuric chloride of mercury. He further states that the pain of urination is above all greatly diminished and at the same time vesical capacity increases, prenulence becomes less and haematuria disappears.

Lung's published a case in which immediate improvement followed the instillation and a year and a half later the patient had greatly improved; he passed urine every two hours, without pain and without blood.

On the other hand, Bynon in one case washed out the bladder with a solution of mercuric chloride of mercury 1/5000 which caused great pain and laid the patient up for days.

1) Vigneron - Gaz de Hop. 1873 loc. cit.
2) Lung - Ann de l'Int. de l'Org. 96. 1873 p.196.
Lumeau and Foquard oppose
the use of perfusions of mercury.
Lumeau, however, reports one
case of tubercular cystitis of 15 years'
standing in which there was notable
amelioration after instillations.
Guyon's method is to begin by
instilling into the posterior urethra
20-30 drops of a perfusion of mercury
solution 1 in 5,000 and increasing
its strength finally to 1 in 1,000 using
fewer drops.
Boil until the patient emits
a vapor over the bladder with a
catheter. Pass an olivary tongue
(12-15) back until the resistance
of the sphincter of the membranous
urethra is felt for a little in and
until
a woman use an 18-20 instrument
and pass in a little beyond the neck
of the bladder.

2. Lumeau - Journ. de Med. de Bordeaux 1892.
While recommending instillation, Surgeon states that he has had encouraging results from medical treatment alone and recommends its adoption along with the instillation.

**Nitrate of Silver.** This remedy has had a more extended trial than the previous. The experience of Surgeon as to its benefit to derive from its use differs.

Jackson and Heath, amongst others, have found it serviceable in giving relief. Jackson recommends the use of strong solutions of nitrate of silver (3/4 to 3/11 - 3/1). Alexander's case, previously mentioned in relation to climatic treatment, was treated with nitrate of silver but he has seen other cases aggravated by it. Keyes regards it as unreliable and Surgeon deprecates its use as lengthy and painful.

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Jodoform - Petit, Record and Berkeley Hill speak of its value in tubercular cystitis, although Record records a case in which it was badly
omised.

The hands of most surgeons its use has not been successful.

Petit recommends an enema containing 20 grammes of jodoform and 10 minims of laudanum half
the injection be withdrawn in ten
minutes, the rest left as long as
possible.

Jodoine - Hamilton of Chicago

recommends in an early stage of
the disease the use of a solution of
iodine in water. Bellefield cites two
cases in which benefit was derived
from instillations of trichloride of
iodine 1/4 p. c. increased gradually to

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1 Petit - Ann. de Med. de Belg. 9 p. 1892.
2 Record - 48 1887 p. 635.
5 Bellefield - Jour. of cut & jr. 8 in 1897 p. 301.
Boracic Acid. - Boracic acid and
Action is very useful for washing out
the bladder previous to the application
of the remedy and is sometimes used
alone. Lavaux considers that the
use of boracic acid alone is
valuable in the treatment of tubercular
cystitis; and that it should be used
before having recourse to purgatives
of mercury.

Opium. - Injection of dilute
solutions of tinctures of opium have
been found useful in relieving pain;
it may be used alone or combined
with other applications.

Cocaine. - Whilst Lavaux re-
commends the use of cocaine (along
with boracic lotion), Siepmann amongst
others considers cocaine useless in
relieving the pain of cystitis.

(3) Operative. - Operative
Measures are adopted for the

---

1 Lavaux. - Le Semaine Méd. April 27th. 1872
Surplus must of palliating and curing the disease.

There are few cases in which one hopes to do more than palliate, the results of radical treatment having been so far disappointing. 

Bryson, from his experience of operations in vesical tuberculosis, decides that "operative means are insufficient to cure and are harmful just to the extent to which they resemble the tubercular lesions."

"For pathogenic organisms grow more rapidly in moistened culture media."

In a discussion on the operative treatment of vesical tuberculosis before the French Surgical Congress 1889, several surgeons spoke of the value of removing localized tuberculosis by operation and agreed that as a rule pulmonary tuberculosis.

(2) Gaz. des Hop. 1889 p. 1047
And not contra-indicate operation.

Jacobson considers that treatment, "in judiciously selected cases," should be as thorough as in tuberculosis of the skin and glands, and done carefully.

The indications in treatment are:
1. to suppress the function of the bladder and in some cases
2. to treat the lesion directly (Syring).

The first indication may be carried out in the female by dilatation of the urethra, by urethral cystotomy or supra-pubic cystotomy, in the male by opening the urethra in the perineum and dilating the neck of the bladder, as recommended by Thompson.

Urethral cystotomy or supra-pubic cystotomy.

1a. Dilatation of the urethra in the female. This is the simplest mode of draining the bladder.

Dilatation is usually accompanied by application, most often of antiseptic.

of silver to the interior of the bladder.
This treatment has given temporary
relief in the hands of Jacobson,
Health, and Vannini. But in the
statistics of Reclus and Duflay four
cases are given all unsuccessful.
Cystotomy of the urine for urethra
has also been performed but without
success and in one case at least the
bladder wall was perforated (Vigneron).

Kolff - Cystotomy - The relief
obtained by opening the bladder
through the vagina is shown in two
cases recorded by Le Dentu and in
a case of spontaneous opening recorded
by Demi.

Senn and Pichler recommend
this operation in preference to the
suprapubic.
Pichler says "in the females by a

\[1\] Vennini - cit. Le Dentu (loc. cit. supra).
\[2\] Reclus and Duflay - Prat de Chirurgie. 18\textsuperscript{a}. 1901.
\[5\] Demi - Affections des reins.
\[6\] Pichler - Principles of Surgery. 284 v.
\[7\] Pichler - NY Med Journal, 1892. 256.
generous vesico-vaginal opening an equally efficient and much more convenient outlet to the bladder is furnished than could be had above the pubes."
Sonne recommends an opening in the anterior vaginal wall 1½ inches long, entering the perineum membrane of the bladder to that of the vagina and treating the wound with the sharp-pointed.

(c) Perineal operations—These are now pretty generally discarded in favour of suprapubic cystotomy. A perineal opening does not give such free access as the suprapubic and is generally through the scarcd tissues. In draining the bladder by the perineum it is found impossible in most cases to keep a tube in, owing to the irritation it causes, and the urine flowing
over a diseased surface is also apt to cause further irritation. Little relief is as a rule obtained by these operations.

1. Suprapubic Cystotomy -

This operation was first introduced for the cure of tubercular cystitis by Eugenio in 1885.

It gives relief to distressing symptoms and stopping haematuria. The operation is invaluable of 23 recorded cases of suprapubic cystotomy, in which the result is given, there was immediate relief in all but one.

One usually finds that there is complete relief of pain and frequency of micturition and cessation of haemorrhage and the urine tends to become clear with less pain. Unless the pain comes from the sources (Bell),

Relief is usually obtained even

---

where the symptoms are severe and the disease is advanced as in a case reported by Posthumus.

The operation is performed in the usual way, care being taken as to the injection of the bladder. Guyon observes that previous injection of the bladder is dangerous and apt in some cases to cause rupture.

The bladder is often difficult to get at owing to contraction. Reverdin recommends the use of a sound, the head of which is made to project, as a guide in opening the bladder.

Authorities differ as to the advantage obtained by the use of a Petersen bag in the rectum.

Some surgeons speak highly of the Hendelensberg position, a position now adopted by Fernow.

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2. Guyon - Ann. de Med. 9th. 1876.
Palmer recommends the use of sail

to operation to render the

as conscious as possible.

After opening the bladder explora-
tion is greatly aided by the

use of a small electric lamp

(Dawson, Fernow, Reverdin).

In all cases, the cut edges of the

membrane of the bladder should

be continued to the skin of the abdomi-
nal wound. The object is to keep

the fistula open as long as

possible and to allow free escape

of the urine, for the results of opera-
tion show that improvement is main-
tained as long as the bladder

has complete rest, but as soon

as the fistula begins to close and

prevent free escape of urine the

vesical symptoms gradually

return.

A drainage tube is left to cause pain

and is frequently not well borne.
Further treatment. After perforating suprapubic cystotomy the tubercular lesion may be treated by scraping or by application of the actual caustics. New chloride nitrate of silver, iodoform and conservative sublimate have all been used as after-applications. Iodoform gauge has found recent favour as an after-application. More radical methods have been tried. Jensen and Schatz excised the tubercular ulcer, but his los the symptom, resumed. Bardenheuer and Bistrich excised the dense membranes of the bladder but without effecting a cure. In one case Fielder, after performing suprapubic cystotomy and puncturing the ulcer opened the abdomen and

1. Loc. cit. infra
passed a tube through; though the tube had to be removed, the after result was good. Being in this case, after failure of a first operation, tried the same method without much success.

In two cases Allman at the time of operation tried to get primary evacuation in both, but there was only temporary improvement.

Fenwick recommends the use of a diathermy, especially devised, as an aid to coagulating and removing ulcers in the bladder.

Bleeding after operation may be arrested by applying pressure (suction), injection of hot boric lotions, hot water 120° (Scoutt), or by plugging (Devoir).

The method of plugging adopted by Devoir is as follows: Two threads are passed through the wound.

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including the vesical mucous membrane, which afford an easy means of holding open the wound and distending the bladder. A syphon tube (Garvan-Perier) is then placed so as to reach and yet not press on the floor of the bladder. Iodoform gauge covered with iodoform on the continent is the laid on the floor of the bladder forming a passage for the urine from the rectum to the drainage tube. The rest of the cavity is then filled with layers of gauge. Drainage is complete and the tampon do not become wet with urine. The gauge may be kept in 1 or 6 days. It is necessary to watch for iodoform poisoning. If reapplied an anaesthetic is necessary. Demonstrate that Albanian and Thun applied the tampon and drained the rectum.
The conclusion arrived at from an examination of recorded cases agrees with the opinion expressed by Viguerie, namely, that cauterizing and excision of the venous membrane, at least in those cases where vesical tuberculosis is secondary, or where the lesion is extensive, has not given better results than the simple suprapubic cystotomy establishing a lasting vesical fistula.

After treatment - It has already been indicated that general treatment should be continued. It is necessary to consider how long it is advisable to maintain the suprapubic opening patent. Fisher recommends that the opening be kept patent until the ulcer, creaturie, the memansa becomes its normal state, the

1. Viguerie - loc. cit. (Eng. Fr. de Clin.)
2. Fisher - loc. cit.
home becomes bland and relatively inoffensive and the bladder again becomes capable of acting as a reservoir for urine and of painlessly expelling it at suitable intervals. In few cases has this desideratum been attained.

**Statistics of Operations:** For the sake of completeness 34 published cases of suprapubic cystotomy are here tabulated. (Unfortunately in several cases the report was incomplete.) In comparison the results of the operative procedure are briefly given afterwards.

The following table shows the results obtained by suprapubic cystotomy, with and without further treatment, and in addition the sex and age of the patients with the names of the operating surgeons.
<table>
<thead>
<tr>
<th>No.</th>
<th>Sex</th>
<th>Age</th>
<th>Surgeon</th>
<th>Further treatment</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>47</td>
<td>Orgelolt</td>
<td>None</td>
<td>Relief. Temporary cure. 18 months later recurrence, left side tuberculous.</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>14</td>
<td>Pinsett</td>
<td>None</td>
<td>Relief. Dealt with two months later lost kidneys and bladder tuberculous.</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>14</td>
<td>Loxton</td>
<td></td>
<td>Relief. Dealt next day from cachexia. (advanced tuberculosis).</td>
</tr>
<tr>
<td>4</td>
<td>M</td>
<td>7</td>
<td>Radnor</td>
<td>None</td>
<td>Relief. Late nephrectomy. Dealt in one month.</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>17</td>
<td>Harrison</td>
<td>None</td>
<td>Relief. 3 years later in state good. Second operation performed.</td>
</tr>
<tr>
<td>6</td>
<td>M</td>
<td>17</td>
<td>Bangs</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(1) Temporary relief only.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(2) Terminal wound made and tube passed through.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>M</td>
<td>44</td>
<td>Long</td>
<td>Selfperformed applied</td>
<td>Relief. 4 years later had gained strength but only a little frequency.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Patient</th>
<th>Diagnosis</th>
<th>Surgery</th>
<th>Post-surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 M 40</td>
<td>Scaphed</td>
<td>Relief</td>
<td>Death</td>
<td>3 years later.</td>
</tr>
<tr>
<td>9 M</td>
<td></td>
<td>Contained</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 F 25</td>
<td>Scaphed</td>
<td>Contained</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 M 26</td>
<td></td>
<td>Contained</td>
<td>Relief</td>
<td>Gradual return.</td>
</tr>
<tr>
<td>12 M 21</td>
<td></td>
<td>Contained</td>
<td></td>
<td>Death 1 year later.</td>
</tr>
<tr>
<td>13 M 18</td>
<td></td>
<td>Contained</td>
<td>Relief</td>
<td>Scar 5 months later.</td>
</tr>
</tbody>
</table>

(1) Surgery - Congr. Fr de Chenuq. 1858 & 1859.
(2) Surgery - cit Verginer Congr. Fr de Chiu 1872 p.753.
<table>
<thead>
<tr>
<th>No.</th>
<th>Date</th>
<th>Sex</th>
<th>Initials</th>
<th>Condition</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>M 22</td>
<td>M</td>
<td>Gugon</td>
<td>Averted</td>
<td>Relief, 6 months later in status quo</td>
</tr>
<tr>
<td>15</td>
<td>M 18</td>
<td>M</td>
<td>Melker</td>
<td>Averted</td>
<td>Relief not complete, 8 months later improved in some instances</td>
</tr>
<tr>
<td>16</td>
<td>?</td>
<td>?</td>
<td>Aberson</td>
<td>Averted</td>
<td>Relief only temporary, temporary relief, death in a few months from unnown reason</td>
</tr>
<tr>
<td>17</td>
<td>?</td>
<td>?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>M 27</td>
<td>M</td>
<td>Rowe</td>
<td>Averted</td>
<td>Relief, 1 year later averted</td>
</tr>
<tr>
<td>19</td>
<td>M 29</td>
<td>M</td>
<td>Reverlin</td>
<td>Averted</td>
<td>Relief in good health 5½ years later</td>
</tr>
<tr>
<td>20</td>
<td>F 7</td>
<td>F</td>
<td>Bardenhan</td>
<td>Excision of</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>F 19</td>
<td>F</td>
<td>Scasen</td>
<td>Excision of</td>
<td>Destructor never closed, death with tuberculosis of kidneys and bladder</td>
</tr>
</tbody>
</table>

Notes:
- "Abb Melker - Ann. der. Mald. 1892 p. 206" |
- "Aberson - cit. Vignons loc. cit. supra" |
- "Rowe and Scasen - cit. Reverlin" |
- "Reverlin - Ann. der. Mald. 1899 p. 263" |
- "Bardenhan - cit. Reverlin + Section 94 of Surgey"
<table>
<thead>
<tr>
<th>Date</th>
<th>Patient</th>
<th>Procedure</th>
<th>Relief</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 F 35</td>
<td>Schatz</td>
<td>Excision under Relief: temporary cure</td>
<td>Symptom resumed</td>
<td></td>
</tr>
<tr>
<td>23 M 30</td>
<td>Eigenbrodt</td>
<td>Incised and Relief: chest in a contained few months form multiple tubercles including vesical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 M 30</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td></td>
</tr>
<tr>
<td>25 F 42</td>
<td>Schwer</td>
<td>Cancelled</td>
<td>Relief: temperature improvement</td>
<td></td>
</tr>
<tr>
<td>26 M 28</td>
<td>Seine</td>
<td>Tumor applied</td>
<td>No further information</td>
<td></td>
</tr>
<tr>
<td>27 M 22</td>
<td>Pocchi</td>
<td>Cancelled</td>
<td>Relief: breath improved</td>
<td></td>
</tr>
<tr>
<td>28 M 18</td>
<td>&quot;</td>
<td>Cancelled and Relief: 2 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29 F 19</td>
<td>&quot;</td>
<td>Teflon gauge Relief: 5-6 months late applied</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Schwer – Cit. Kuncer
Eigenbrodt – Cit. Kuncer
Pocchi – Cit. cit. supra.
Teflon – N.Y. Med Journ. 1892 p. 256
### Suprapubic Cystotomy (cont)

<table>
<thead>
<tr>
<th>No.</th>
<th>Age</th>
<th>Sex</th>
<th>Method</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 M 50</td>
<td>Fische</td>
<td>Slit form</td>
<td>No relief, died 10 weeks later from exhaustion.</td>
<td></td>
</tr>
<tr>
<td>31 M 26</td>
<td>Bell</td>
<td>Cantorised</td>
<td>Relief 3 months later. Good health except for some frequency.</td>
<td></td>
</tr>
<tr>
<td>32 M 23</td>
<td>&quot;</td>
<td>Scared and continued</td>
<td>Relief 10 years later. Well except for slight incontinence.</td>
<td></td>
</tr>
<tr>
<td>33 M 35</td>
<td>&quot;</td>
<td>&quot;</td>
<td>Relief. 14 years later, much improved. A little incontinence.</td>
<td></td>
</tr>
<tr>
<td>34 F 20</td>
<td>Battle</td>
<td>Incised and Zin chloride applied</td>
<td>Relief. Seen (date not given) but urine could be retained 3 hours and patient seemed well.</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks** - Of all these cases in which suprapubic cystotomy was performed it may be observed that there are only three in which the patient

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© Fische - loc. cit. supra.

© Bell - Journ. lit. and gen. med. 1892 p392.

has survived the operation three
years and was in a satisfactory condition
at the end of that time, and in one of
these (Harrisons) suprapubic cystostomy
was alone performed. In seven others
the condition was satisfactory at the
time they were reported, the time varying
from three months to two years after operation
of 28 cases, in which a cecum was
attempted 6 died within a year after
operation.
Redel and Deplay give the follow-
ing results of 14 cases of suprapubic
cystotomy:
14 died within a year (3 of pyelo-nephritis
and 10 of general tuberculosis).
6 had recurrence some weeks or months
after the operation.
4 others have remained cured (2 for
4 years, 3 for 2 years and 1 for 8 months).
Results of other operations in
published cases:
Supraplacental cystotomy - 4 cases, 2

Redel and Deplay—Barte de Chilean. loc. cit.
Temporarily relieved: no benefit in 2.

Opening urethra in perineum and dilating neck of bladder: 4 cases. 1 no benefit; 3 temporarily relieved.

Holger cystotomy: 2 cases. Both markedly improved.

Dilatation of urethra and neck of bladder: 2 cases. Both temporarily relieved. (Reder and Surland's statistics gave 44 cases, all unsuccessful.)

 Vesical curettage for urethra: 4 cases. 2 not relieved, 1 slightly relieved, 1 temporarily relieved.

Conclusions: From a comparison of the results obtained by different modes of treatment, it would seem advisable, unless the disease is early and primary (or secondary to some slight and distant tubercular lesion), to treat the case in the first place medially.

In the latter condition only can one hope, as already pointed out
By Vignier, for good results from scraping, cauterying or excising the tubercular lesion in the bladder. Medical treatment, including change of climate etc., alone failing, recourse should be had in addition to injections or installations — preferably of Mercurius nitric. or salva or Brains tinct. One topic failing, another should be tried. Severe symptoms may require local treatment from the first. Where the symptoms persist in spite of other treatment cystotomy is indicated and should not be unduly deferred (Pilcher). In women the choice of operation lies between suprapubic and Koch's cystotomy. In men and children suprapubic cystotomy has given better results than other operations.


Pilcher — *loc. cit. supra.
Further procedure depends on the condition found; in a few cases, especially where the disease is early and situated on the posterior wall, good results may be expected from scraping and cauterizing. In all cases an attempt should be made, after performing eustachian, to obtain a permanent fistula.

FINIS