CASE II.

J. S., aged 59, seen in consultation with Dr. Menzies, of Workop, on January 31st, 1908.

The patient had enjoyed robust health until a few months previously, when he began to have attacks of colicky pain in the abdomen and had to resort to the use of purgatives. A fortnight previously the pain became much more severe, and there had been complete obstruction of the bowels for eight days; vomiting had set in and was progressive in character. His abdomen was distended and tympanitic, while vigorous peristaltic movements could be seen and felt through the parietes. These were accompanied by a sharp increase of the pain. The rectum was empty. His pulse was of good quality, and his general condition, apart from the obstruction, satisfactory, but as the usual medical measures had failed to give relief it was thought best to operate forthwith.

The abdomen was opened in the middle line below the umbilicus and a thorough but ineffectual search made to find the obstruction. All that could be ascertained with certainty was that it was lower than the transverse colon. A second smaller opening was made over the caecum, and through this a portion of the distended ascending colon was withdrawn and stitched to the skin. Before introducing a Paul's tube the central wound was closed and sealed with collodion. The operation was immediately successful in relieving his symptoms, and the central wound healed under the first dressing.

In order to locate accurately the site of the obstruction he was placed in the high Trendelenburg position, and the lower colon filled with water under a pressure of two feet. About three pints could be introduced, and this observation, conjoined with what I had learnt during the exploration, enabled me to fix the point about the splenic flexure.

The patient, being now in very good condition, was taken to a surgical home in Sheffield, and the abdomen entered through the left semilunar line. A hard nodular tumour was found at the splenic flexure. After dividing the outer layer of the mesocolon, it was with difficulty drawn out of the wound. Several enlarged glands were present, and these, together with the growth, were freely excised, and an end-to-end anastomosis effected by continuous suturing. The wound had quite healed at the end of a fortnight, and, after testing the patency of the resected colon by injecting water into the rectum until it escaped from the colostomy opening, the artificial anus was closed. Aseptic healing resulted, and the patient returned to his home six weeks after the first of his three operations. He remained in excellent health for the succeeding eighteen months; then symptoms of obstruction reappeared. The abdomen was once more opened, and a local recurrence, together with a secondary nodule in the liver, were found. The colon was short-circuited by anastomosing the caecum with the sigmoid. This gave him the desired relief, and he lived in comparative comfort for another eight months. It is of interest to note that this patient had actually been gaining weight, and was not conscious of any loss of strength or vitality up to the onset of obstruction.

CASE III.

W. B., aged 55 years, was seen in consultation with Dr. George Booth, of Chesterfield, on September 29th, 1908.

The patient, who was stout and of sedentary habit, gave a history of chronic constipation for many years, but with the aid of purgatives and enemata he had had a hard motion almost daily until six days previously. Since then there had been complete obstruction, with recurrent attacks of acute abdominal pain accompanied by violent intestinal movements. The abdomen was greatly distended, and he complained of tenderness over the caecum and the sigmoid. The rectum was empty and ballooned. There had not been any vomiting, but his tongue was brown and dry, probably owing to morphine which he had taken. His urine contained 8 grains of sugar per ounce, and had constantly done so for at least seven years, but there was no polyuria. The pulse was 108 per minute, and of good quality.

He was conveyed to a surgical home in Sheffield. An enema of 4 oz. of mist. alba and 1 oz. of glycerine produced a free evacuation and he rapidly improved. Hydrostatic distension of the lower bowel suggested a block about the upper end of the sigmoid; but, in view of the long-continued glycosuria and his flabby condition, operative measures were put off in the hope that acute obstruction might not recur. He went home, but in a few days his troubles returned, and, with a full knowledge of all the facts in his case, he pressed for an operation. He was readmitted to the surgical home, and the abdomen explored through the right semilunar line. A small, hard, freely movable growth could be felt in the sigmoid. The liver and other abdominal viscera were examined for secondary nodules, but nothing abnormal was found.

The caecum was enormously dilated and its muscular tissue greatly hypertrophied. A Paul's tube was tied into it, and he was thereafter quite comfortable.

Fourteen days later the growth was excised through an opening on the left side. The resected ends of the bowels were united axially by continuous suturing. The operation caused much shock, and at its close the pulse-rate was 160 per minute. His subsequent progress was quite satisfactory, and at the end of a fortnight the caecal anus was closed. He remained quite well, except for his glycosuria, until the autumn of 1912, when without any premonitory warning acute obstruction supervened while he was on a holiday in the south of England. He was operated on, and a tense band which was causing the obstruc-

tion, was divided, but he did not recover. The operating surgeon failed to find any evidence of recurrence, but the abdomen was not fully explored, and there was no *post-mortem* examination.

CARCINOMA OF THE PROSTATE GLAND:

A STUDY OF THIRTY-THREE CASES.

BY

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THE subject of malignant tumours of the prostate gland is of considerable interest, but I propose to only deal with carcinoma. While sarcoma of the prostate is extremely rare, carcinoma of the prostate is by no means uncommon. Albarran's statistics show that 14 per cent. of all prostates which are taken away by operation turn out to be malignant; while H. H. Young, of the Johns Hopkins Hospital, Baltimore, goes even further, and states that 21 per cent. (that is, 1 in every 5 cases) of all enlarged prostates removed show a tendency to malignancy.

Some authorities definitely state that cancer of the prostate supervenes on a simple adenoma; others are equally positive that it does not. The practical importance of settling the question is that, if an innocent tumour is a precursor of a malignant growth, then it will be the duty of the surgeon to recommend that every benignly hypertrophied prostate gland be removed by operation immediately the patient seeks advice—that is, directly the condition begins to cause symptoms. Young of Baltimore, who has made a very careful study of the pathology of carcinoma of the prostate, says:

It may begin as an isolated nodule in an otherwise benign hypertrophy; or a prostate enlargement, which has for many years furnished symptoms and signs of benign hypertrophy, may suddenly show signs of malignant hypertrophy.

As to the way cancer of the prostate spreads, Young's description is well worth quoting. He says:

It spreads along the ejaculatory ducts into the space immediately above the prostate between the seminal vesicles and the bladder and beneath the fascia of Denonvilliers. Then the disease gradually invades the inferior surface of the trigone and the lymphatics leading towards the lateral walls of the pelvis, but involvement of the pelvic glands occurs late, and often the disease metastasises into the osseous system without first invading the glands.

His operation for radical extirpation of the prostate in cancer was devised from observations made at operations and at autopsies. Like cancer of the thyroid gland, secondary deposits in carcinoma of the prostate are out of all proportion to the primary growth. The internal iliac lymphatic glands are the first group to be secondarily invaded.

I have collected notes of 33 cases of carcinoma of the prostate, and, although some of the records are incomplete, I have endeavoured to make a careful analysis of them. No case had secondary deposits in bone so far as I have been able to ascertain.

A.—SYMPTOMS.

1. *Duration.*

With regard to the period between the patient first noticing anything wrong and the onset of symptoms which compelled him to seek the aid of the surgeon, in 66 per cent. the onset of the initial symptom was within twelve months of him coming under the care of the surgeon; further, in 10 of these cases—that is, 30 per cent. of the total—the time was only three months.

		Cases.	
Within	3 months	10	30 %
"	6 "	2	} 66%
"	9 "	3	
"	12 "	7	
"	18 "	1	
"	24 "	5	
"	3 years ...	2	}
"	4 "	2	
"	25 "	1	
		33	

* Read before the Newcastle-upon-Tyne Division of the British Medical Association.

The average duration of these symptoms, excluding the last-mentioned case (which is probably not an accurate record), is fourteen and a half months.

I would call attention to the shortness of this interval compared with a simple hypertrophy of the gland, where it is not uncommon for the patient to have indications of his disease for ten to fifteen years before seeking advice.

2. Age.

While the youngest was 29 years old, and the senior case of the series aged 78, 26 cases out of the 33—that is, 78 per cent.—occurred between the ages of 55 and 74. Further, 30 per cent. of the total—that is, 10 cases—occurred between the ages of 65 and 69.

1 Case was aged	...	29
1 " "	...	44
2 Cases were aged	...	52
5 Cases were between	...	55 and 59
5 " " "	...	60 and 64
10 " " "	...	65 and 69
6 " " "	...	70 and 74
3 " " "	...	75 and 78

33

The average age was 61.

3. Onset Symptom.

Before the terminal stages it is uncommon for the bladder to be secondarily invaded from carcinoma of the prostate gland, therefore the vesical symptoms usually complained of are those of: (1) Partial obstruction; (2) retention of urine; or (3) superadded sepsis.

In 13 of the 33 cases—that is, 40 per cent.—the symptoms in carcinoma began with nocturnal frequency of micturition; 10 of the cases—that is, 30 per cent.—with gradual obstruction; in 4 cases there was sudden obstruction.

The Onset of Symptoms.

	Cases.
Nocturnal frequency	13 = 40 %
Gradual obstruction to urination	10 = 30 %
Sudden obstruction	4
Haematuria	2
Pain in perineum	1
Pain at end of the penis after micturition	1
Not stated	2
	33

4. Frequency of Micturition.

As an established symptom, increased frequency of micturition is the most prominent as a rule; if, however, retention of urine has supervened, normal micturition is rarely established.

With regard to the increased frequency of micturition, or not, at the early stage of the disease, in 26 of the 33 cases it was present day and night; in 4 cases during the night only; and in 3 it was not stated.

5. Pain.

The pain in carcinoma of the prostate is variable and not characteristic.

Situations of the Pain, if any, Complained of before Retention of Urine Supervened.

Base of sacrum	...	2 cases
Perineum	...	3 "
Along the length of the urethra	...	5 "
End of the penis	...	5 "
Hypogastrium	...	5 "
No pain whatever	...	6 "
Not stated	...	7 "
		33

Relation of the Pain to Micturition prior to the Onset of Retention of Urine.

Before micturition	...	5 cases
During micturition	...	7 "
After micturition	...	8 "
Not stated	...	13 "
		33

6. Urinary Stream.

Of the 33 cases there were symptoms of gradual obstruction in 25, while in the remaining 8 the complete obstruction was sudden. Complete retention eventually supervened in 24 cases; in 8 of the series there was partial obstruction resulting in a more or less amount of residual urine, though the obstruction had not become absolute; and in the remaining case there was no

residual urine. The last-mentioned was found accidentally in a man, aged 70, who came complaining of a direct inguinal hernia, and the prostatic condition was only discovered in the course of a routine examination.

7. Haematuria.

The statistics compiled from this series definitely confirm the orthodox view that haematuria is not common in carcinoma of the prostate. In 23 of the cases—that is, in nearly 70 per cent.—there was no bleeding at all; it was only present in 6; and in the other four cases it was not mentioned in the records.

The probability is that in the latter cases there was no haemorrhage, therefore we may assume that in all probability 27 out of the 33 cases had no bleeding. This would give a percentage of nearly 82 without haematuria.

With reference to the relation of haematuria to micturition, in the 6 cases mentioned, the blood preceded the urine in 5, and in the remaining case it appeared at the end of micturition.

Bleeding at the beginning of the flow of urine indicates that the prostatic urethra has become invaded by growth, while the appearance of blood at the end of micturition shows that the adjacent trigone of the bladder has become secondarily involved, which, as previously stated, is not common.

Referring to the general condition of the patient, emaciation was marked, but in the later stages only; the complication of secondary consecutive nephritis, due to back pressure upon the kidneys, was not a noticeable feature.

B.—SIGNS.

1. Rectal Examination.

Rectal palpation is, of course, the most important step in the diagnosis of a prostatic condition. I may be forgiven, therefore, if I mention a little detail in making this examination.

The rectum should be empty when the examination is made, and an enema should, if necessary, have been given some little time previously. Precautions should be taken to examine the prostate only when the bladder is empty. Unless the point is observed, no account can be taken of the alleged size of the prostate, whether this be normal or pathological. I have several times been present at the operation for suprapubic prostatectomy for a benign tumour, when expectations have been far from realized, and an enucleated prostate the size of a walnut only was retrieved, when the spectators had been promised one the size of a Tangerine orange! Therefore, to be accurate as to the existence of an enlargement or not, it is necessary to take the precaution of ascertaining that the bladder is empty before a rectal examination is made.

The patient may lie on his back, on his left side, or in the knee-elbow position. For an ordinary case I much prefer the knee-elbow posture, though if the case be difficult I use all three. I certainly think that the point concerning the fixity can best be made out with the patient in the knee-elbow position.

The lubricated examining finger, that is the index finger, should be kept fully extended until its whole length has been introduced through the anus; then, and not until then, is the palpation of the prostate to be begun; if the finger begins its investigations before its full introduction has been effected, a satisfactory examination may not be permitted by the patient. Rectal palpation in a case of carcinoma of the prostate is usually painful; in simple tumour it is only uncomfortable.

The points to ascertain are:

A. Prostate.

1. Whether it is enlarged or not.
 2. If it is bilobed or not—that is, is there a median sulcus?
 3. Its consistence—that is, whether the prostate is soft, elastic, hard, stony-hard, or cystic.
 4. Its surface—whether it is smooth or nodular.
 5. Whether the gland is fixed or not to the lateral pelvic wall.
 6. Examine the median sulcus or the position of same with the cystoscope *in situ*, as recommended by Young.
- (Of these I think Nos. 4 and 5—that is, nodules and fixity—are far and away the most important.)

B. Seminal Vesicles.

To see if there is any infiltration or not.

C. Lateral Pelvic Walls.

Examine the lateral walls of the pelvis, as far as palpable, in order to see if there are any glands infiltrated or not.

A marked feature in carcinoma is that the median raphe of the gland disappears and that the outline of the normal prostate has lost its bilobed, elastic, smooth, and movable characteristics.

In 25 cases of the series—that is, nearly 70 per cent.—there were nodules palpable on the surface of the gland together with fixity.

Enlargement without hardness	...	1 case
Hard only	...	1 "
Nodules without fixity	...	3 cases
Fixity without nodules	...	4 "
Nodules and fixity	...	23 "
Not stated	...	1 case
		33 "

With regard to the fixity, the normal groove between the pelvic wall and the prostate is filled up; moreover, the hardness of the gland is absolutely stony.

2. Residual Urine.

The residual urine should be estimated prior to cystoscopy. Before the surgeon passes the catheter for this purpose the patient will have a much better chance of voiding all the urine he can if he is standing up, and if this be done the observation on the amount of residual urine will be more accurate.

3. Cystoscopy.

A cystoscopic examination may be difficult, for the prostatic urethra is not only narrowed, but is often tortuous; therefore there is a tendency to obstruction and to bleeding. Again, the cystoscope is gripped by the prostatic urethra in a peculiar manner, and there is often a grating sensation when the instrument is moved onwards or is withdrawn.

Nodules on an intravesical enlargement, also secondary invasion of the bladder trigone (should this be present) may be seen. The absence of vesical calculus, or growth of the bladder, can be ascertained as an aid to the differential diagnosis.

C.—DIFFERENTIAL DIAGNOSIS.

The diagnosis of an advanced case of carcinoma of the prostate is comparatively easy. Briefly put, the symptoms of malignant growth of the prostate are those of a simple hypertrophy, but with the addition that the symptoms are very much quicker in declaring themselves and in becoming urgent. The symptoms of frequency of micturition, gradual obstruction to urination, in a man between 55 and 75 who has on rectal examination a stony-hard nodular prostate, which has lost the interlobar groove, and which is fixed to the walls of the pelvis, are conclusive evidence of carcinoma of the prostate. The difficult cases are where there are nodules without fixity of the prostate to the pelvic wall, or where there is fixity without the nodules.

I will briefly go over the various conditions which might be confounded with carcinoma of the prostate.

1. Chronic Inflammation of the Prostate, especially in a Middle-aged Man.

This is the hardest condition of all to diagnose from early carcinoma of the prostate, and in some cases it is practically impossible to tell whether it is simply a chronic inflammation, or whether it is a malignant growth in the early stages. Young makes a great point in the diagnosis of a rectal examination with the cystoscope *in situ*. If there is a definite hard band at the site of the interlobar groove between the examining finger and the cystoscope, then he considers the condition is one of malignancy. The cystoscope might possibly show nodules on an intravesical enlargement of the gland.

In such a case routine rectal examination would ascertain if the seminal vesicles were infiltrated, or if the enlarged glands on the pelvic wall were palpable. This variety of pathological prostate is usually fixed to the pelvic wall, and I then rely on the absence of nodules in diagnosing an inflammatory condition.

2. Abscess of the Prostate.

This in an elderly man has many times proved a difficult point in diagnosis. In one case in this series the malignant condition was complicated by recurring abscesses.

3. Tertiary Syphilitic Prostatitis.

Nodules are sometimes felt, but they are painless; they are stony-hard, and there may, or may not, be fixity of the gland. Signs of the condition elsewhere will help in the diagnosis—for example, perforation of the hard palate in the middle line, old adhesions of the iris, characteristic scars on the upper and outer aspect of the legs, etc.

4. Tuberculous Prostatitis.

This is rare after the age of 40. Nodules are felt by the examining finger, but they are better outlined than in the carcinomatous condition, and appear to be more on the surface; like tubercle everywhere, the foci tend to break down when areas of softening can be felt; tuberculous nodules elsewhere—for example, in the testes and vas—help in the diagnosis; if there is also tuberculous cystitis, this can be seen with the cystoscope, and the urine will contain tubercle bacilli.

5. Carcinoma of the Base of the Bladder.

This is sometimes difficult to diagnose from carcinoma of the prostate, but in this condition the normal elastic, bilobed, smooth-surfaced prostate can be felt in front of the growth—that is, nearer the anus. Moreover, one or both ureters are more likely to be involved, and the patient will then suffer from renal pain. The cystoscope will make the diagnosis.

6. Phleboliths.

These are superficial nodules, which are neither fixed nor tender. There is no fixity of the gland.

7. Prostatic Calculi.

Calculi occur in younger men, but they occasionally give rise to an error in diagnosis, as there is sometimes also fixity of the gland; moreover, such calculi, especially of the fig-seed variety, can simulate malignant nodules. An x-ray examination will settle the question.

8. Vesical Calculus.

A very large stone in the bladder has on some occasions caused an error in diagnosis. Radiography and cystoscopy will eliminate this possibility.

9. Urethral Stricture with a Calculus in the Prostatic Urethra.

Such a condition, where there is practically always a perineal fistula, may give rise to the doubt about carcinoma of the prostate. However, the urethroscopy will show the stricture; the calculus may be felt in that portion of the urethra between the prostate gland and the triangular ligament. An x-ray examination will confirm the diagnosis.

10. Sarcoma of the Prostate.

Sarcoma is rare; it attacks young adults. Usually there is an enormous tumour which bulges into the rectum, and may even cause intestinal obstruction. It is extremely like an abscess in the prostate.

D.—PROGNOSIS.

In an endeavour to gauge the prognosis I have considered only those cases where the full course of the disease is known—that is, from the date of the onset of symptoms to the time of death.

I have been able to follow up 16 cases in the series as follows:

1 case lived 1 month after onset of symptoms	
1 " 4 months "	" "
1 " 6 " "	" "
1 " 8 " "	" "
1 " 20 " "	" "
5 " 2 years "	" "
1 " 3 " "	" "
1 " 3½ " "	" "
1 " 4 " "	" "
2 " 4½ " "	" "
1 " 5½ " "	" "

This gives an average duration of twenty-eight months.

E.—TREATMENT.

In a proportion of cases operated upon, an adenomatous prostate with a carcinomatous nodule in its interior is enucleated. If, during this operation, any portion of the

gland is unduly adherent, malignancy must at once be suspected. The specimen on removal should be carefully sectioned, as a malignant nodule may be found in the middle, and any slight adherence of the gland to its "false capsule" may show the present boundary of the round celled infiltration, which is always present at the outermost edge of the growth.

Before it is possible actually to diagnose the condition of carcinoma, it is most probably too late to operate to obtain a radical cure. Young asserts that one only out of five prostates removed shows a malignant tendency; with such striking figures I think, therefore, we should very seriously ask ourselves if, in every case of benign tumour of the prostate, the gland should not be removed by operation immediately it is discovered.

The principal risk in the operation of prostatectomy is the condition of the kidneys, for back pressure from obstruction to urination destroys the renal secreting tissue. If the prostate be removed before such renal complications have supervened the operative mortality should be no greater than from a radical cure of inguinal hernia upon a person of the same age.

I consider that the enucleation, or attempted enucleation, of any prostate where there is a suspicion of malignancy is not justifiable. I have been present on at least two occasions when an attempt at enucleation had to be abandoned owing to furious bleeding; when once it begins it is extremely difficult to stop. Apart from this I cannot help feeling that a digital disturbance tends ultimately to much earlier dissemination.

Young devised an operation for a radical cure of carcinoma of the prostate, and the introduction of the operation followed observations which he had been able to make during operations and at autopsies. As mentioned previously, the spread of the condition always takes place backwards towards the seminal vesicles. His operation is an anatomical one, and aims at removing the whole of the prostate gland with the prostatic urethra, the seminal vesicles, part of the vasa deferentia, with the anterior portion of the base of the bladder. He severs the bladder to the membranous urethra, and relies upon the compressor urethrae for the maintenance of continence of urine. This operation can only be done on an otherwise strong, healthy patient, for it is a long operation. Unfortunately, all cases reported by Young have incontinence of urine, by day at any rate, and personally I consider a patient is better without such a so-called cure of the disease if he is to have his functions so seriously disturbed.

Where a positive diagnosis of carcinoma has been arrived at, let us consider the treatment schematically and think what is going to happen to the patient. If it is a suitable case for Young's radical cure, then the risks of the actual operation, also the probability of some incontinence of urine, will have to be put before the patient and the matter left in his hands. I think he will be wise if he refuses to accept the offer.

Provided the patient is within reach of a doctor, I think it is best not to have any treatment at all until it becomes necessary—that is, until symptoms supervene. The special liability to the sudden onset of retention of urine must be borne in mind. If he is failing to empty his bladder, then the question of catheter life must be discussed, and if this is instituted it is always best to use as large a catheter as possible; a hard—that is, not an india-rubber—catheter is preferable, because the more the prostatic urethra is kept stretched the longer will complete retention be delayed. Provided the patient is one who can be taught the essentials of asepsis, or provided he lives near enough to the doctor to have the catheter passed regularly, catheter life may be advised. There is always a danger of failure to get the catheter in and of the patient getting acute retention.

He should be given the following urinary antiseptic as a preventive to cystitis: Urotropine, grains 8; acid sodium phosphate, grains 30; aqua ad ʒss. Sig. ʒss t.d.s. Opium should be given as required for any pain.

The palliative operation of suprapubic cystostomy, for the purpose of establishing a permanent fistula, is, I consider, the best operative treatment for a malignant growth of the prostate, although I am not in favour of doing this: (1) Until retention is either imminent; or (2) unless complete retention has supervened, and no instrument can be

passed into the bladder; or (3) unless there is great pain, due to, or independent of, catheterization.

If the patient wears a Pardo's suprapubic rubber shield, he can be quite comfortable, and will be able to manage this excellent apparatus by himself. Another advantage of establishing a permanent fistula is, that if the patient has got bad cystitis, due to secondary infection, the bladder can be frequently irrigated through the suprapubic sinus with a minimum of discomfort.

The Bottini operation of incising the prostate by means of a sheathed knife introduced into the prostatic urethra has been tried in some cases. Some surgeons have reported favourably upon it, but it is attended with a mortality, and, as this cutting operation is done absolutely in the dark, it is not one that can be recommended.

SUMMARY.

1. The average duration between the onset of symptoms and the patient seeing a surgeon was fourteen and a half months.

2. The average age was 61.

3. The onset symptom was increased nocturnal frequency of micturition in 40 per cent., and gradual obstruction to urination in 30 per cent. of the cases.

4. Pain was variable, and not characteristic.

5. Urinary obstruction was a marked feature—72 per cent. had complete retention, and a further 24 per cent. partial retention.

6. Haematuria was not common; probably 82 per cent. were without bleeding.

7. On rectal examination, 70 per cent. showed hard nodules, with fixity of the gland.

8. The average duration of the disease from onset of symptoms to death was twenty-eight months.

9. Young's statistics that 21 per cent. of removed prostates show a malignant tendency cannot be ignored. If these figures are accepted, it is a surgeon's duty to remove the gland by operation immediately it begins to cause symptoms. The risks of the operation then are smaller than the risks should malignancy supervene.

10. Treatment recommended when a diagnosis of carcinoma has been made:

(a) In the absence of residual urine, give a urinary antiseptic, with opium for the pain when necessary.

(b) If there is residual urine, begin catheter life, using a large-sized hard catheter; give a urinary antiseptic, with opium if necessary.

(c) If there is obstruction, or, if catheter life is intolerable, establish a permanent suprapubic drainage.

THE annual report of the Jamaica Malaria Commission for 1912 lays great stress on the necessity for intelligent sanitary inspection, without "which mosquito reduction and general sanitation cannot be effectively and economically compassed." The chief sources of malarial mosquitos are stated to be: (a) Sluggish streams and fresh-water swamps; (b) surface drains and gutters; (c) pools and ponds caused by rain water in natural depressions; (d) pools and puddles caused by waste from water pipes; (e) irrigation and drainage trenches. Quinine is now being taken by children in 250 schools, and the reports of teachers show that it has benefited the health of the children and to some extent improved the attendance. Quinine has also been distributed free through the district nurses to poor persons in the west end of Kingston, although that town, owing to a low rainfall and general configuration which favours good drainage, does not show a high malarial-rate in proportion to its population. At the northern portion of the town of Black River Dr. Neish found that 90 per cent. of the children examined were infected. The town of Port Antonio shows a marked advance in sanitation, chiefly owing to the extension of concrete drains and the filling up of swamp lands. There were in Jamaica 3,677 East Indian immigrants under indenture, beside time-expired coolies. During the past five years no fewer than 3,788 fresh coolies under indenture arrived in the island; they are on first arrival very susceptible to malaria, and the location of coolie barracks and the conditions on banana and sugar estates are favourable to the prevalence of the disease. These conditions have recently been investigated and reported on, at the request of the Government, with the view of steps being taken to remedy them. The general malarial incidence has dropped from 42 per cent. of the total hospital admissions in 1907 to 30 per cent. in 1911.