practicable with safety ; all these recovered well, and are rather better than before. Of the remaining four, one has had no return whatever, four years having elapsed since the operation ; a second has slight signs of a return, one year and a quarter since operation, but works hard for his living at 64 years of age ; a third, who, like the last, was at death's door from loss of blood when I operated, has greatly improved, and is actively employed ; but has recently shown some disposition to bleed after exercise, nearly a year since operation. The fourth was greatly improved, and returned to the active life for which he was before disqualified. The others have too recently been operated on, to furnish any material fact to be reported. More ample details are furnished in the Table of Cases drawn up and accompanying this.

I may thus briefly sum up the record of the numerous facts related. For every one of these patients with tumour, in the natural order of events, one result only was possible. Left without surgical aid, death inevitably awaited each : a fate not merely certain, but necessarily involving protracted suffering.

Whatever surgery can accomplish in the way of saving life for several of these patients is obviously so much clear gain. I am therefore satisfied with what has been achieved for the first twenty cases ; having naturally desired greater success ; but I have reason



to expect that it will be greater in the next twenty cases, through having acquired some valuable experience which I have thus attempted, so far as this is possible, to make useful to others.

We may certainly reckon on ability to save life in a few instances, such as are recorded here ; we may also often prolong valuable life, a fact illustrated by several of the cases recorded both by myself and by other operators.

There is still another result which ought not to be overlooked. Whatever value may have accrued to a few patients in the matter of saving or prolonging life, a matter which is wholly incalculable, there has been an opportunity afforded, on a scale never before met with, for careful inquiry into the external physical characters and histological elements of vesical growths. This research has been systematically pursued ; and with the aid of valuable co-operation already referred to, I have been able to present a scheme for classifying the facts obtained, which I trust may prove to be a contribution, however humble, to an improved acquaintance with this important subject.

I append five of the cases which are most worthy to be reported at length, partly because each more or less illustrates a particular type of growth, together with its history and progress, and the symptoms

associated with it, and partly because the kind of after-treatment and subsequent history are to some extent indicated also. The number to each case corresponds with that which marks its place in the table of twenty cases which follows after.

Case 1.—T. R., æt. 29. Fibro-papilloma, or transitional (?).

1880, *July* 26. He first consulted me. I learned that eight years previously he had passed 'a piece of gravel the size of a pea.' After this he felt nothing unusual until three years ago, when his micturition became more frequent, and was followed by pain in the end of the penis, also occasionally blood appeared in the urine, especially after exercise.

With these symptoms, I sounded the patient, and I found a small calculus, which on August 5 was easily crushed and removed. It was composed of oxalate of lime.

Very little improvement followed the operation: the bladder was not quite emptied by the natural efforts; the gum catheter was used daily, and on two occasions gave signs of the presence of something in the bladder, which a subsequent exploration of the lithotrite did not discover. Such results were unusual and somewhat puzzling. Being relieved, he resumed his employment, and was occasionally seen relative to the still existing slight symptoms, which, however, gradually increased.

On October 5 I examined the bladder, and removed a quantity of phosphatic deposit with the lithotrite. I then seized what at first felt like calculus, and partially crushed under pressure; but it was evidently fixed, giving me the impression that I was dealing with a portion of stone partially impacted, and that the remainder would be beyond my reach.

1880, *Nov.* 6. I made exploration after median incision



into the urethra in presence of Dr. Seegen of Carlsbad, Dr. Paggi of Florence, and Mr. Ceeley of Aylesbury. Having introduced my finger well into the bladder, and pressure being made above the pubes, I soon recognised a tumour, about the size of a chestnut, growing apparently from the opposite wall or fundus, and somewhat to the patient's left, coated with phosphatic matter, and evidently the fixed body I had formerly seized with the lithotrite and denuded of its sabulous covering. Taking a pair of small forceps, I adjusted them to a full and firm hold, and then twisted off the mass without difficulty; a small piece or two were subsequently withdrawn, but the tumour appeared to be entirely removed, and very little bleeding followed. He had no bad symptoms, made a rapid recovery, speedily regained good health, never having had any return of symptoms since the operation, now nearly four years ago. He is now in perfect health, June, 1884.

Mr. Stanley Boyd, formerly Surgical Registrar of University College Hospital, examined a portion of the tumour from this case, and his report thereon is as follows:—

'A small piece, taken from the surface of the tumour, was handed to me for examination. It was thickly encrusted with phosphates, and beneath these the surface was finely irregular. On section, the growth was firm and of uniform consistence; but its structure could only be guessed at as fibrous.

'Microscopically, it consisted of fine bundles of fibrous tissue, having a general direction vertical to the surface. Small round cells were scattered pretty copiously at parts, especially towards the free surface, but there was no regularity in their distribution.'

It might perhaps now be classed as an example of 'fibro-papilloma.'

Case 2.—Mrs. F., æt. 30. Fibro-papilloma.

1882, *May* 5. I first saw her with Dr. Philson of Chel-

tenham, and learned that in 1877 she first observed blood in the urine, but had no pain.

In June, 1879, severe cystitis, which became chronic. Throughout 1880–81 much frequency of micturition, but no severe attacks; occasionally blood in the urine.

1882, *February*. Much bleeding. In March, severe cystitis, and confined to her room since.

*May* 9. Dilated the urethra under ether, detecting a growth (represented by the diagram in the Table) at the centre of opposite aspect of bladder behind and above the trigone; and removed three chief portions with the forceps. Bleeding free at first, subsiding during the day. A catheter was tied in, and remained forty-eight hours. She made a rapid recovery, and left town holding water five hours at the end of three weeks.

The tumour was examined by Mr. Stanley Boyd. See report below.

1883, *February*. There has been slight bleeding lately, and she has come up to town at my desire. Dr. Philson was present. I found a growth near the neck of the bladder about the size of a cherry, which I removed with a pair of laterally curved forceps. At the first operation I had only forceps of the ordinary form used in lithotomy, and could not command any outgrowth thus placed, and only constructed other forceps as fresh circumstances demanded. She soon returned quite well.

1884, *April* 17. I heard there was no frequency of micturition, and that there was no pain. Occasionally, after exercise, sees a few drops of blood.

Mr. Stanley Boyd examined the parts removed, and reported as follows:—'The growth consisted of three chief masses of roughly spherical form, one-half to three-quarters of an inch in diameter, and having short, narrow pedicles, and of two or three small sessile masses of similar shape. All the nodules were velvety on account of the projection



everywhere from their surfaces of thin folds, and embranched, somewhat club-shaped processes, one-sixteenth of an inch or less in length. Under the microscope these processes consisted almost entirely of one or two very thin-walled vascular loops of wide calibre, but some showed a good deal of round-celled infiltration. They were covered by a thick layer of epithelium, the component cells of which were columnar, very long, and narrow; the epithelium stripped off with the greatest ease. The mass of the tumour consisted of rather loose connective tissue, containing here and there small collections of round cells. No glandular structure was seen. Vessels very large, numerous, and provided with stout coats in the body of the growth, but towards the surface large numbers of the same wide, thin-walled vessels were seen, as were noticed in the processes on the surface. They had no muscular fibres in their walls. The surface of the growth between the processes is covered by epithelium similar to that on the villi. At the base of the nodule examined some bundles of the involuntary muscular layer of the bladder were seen, but no such tissue existed in the growth.'

Case 7.—W. W., æt. 63. Fimbriated papilloma.

1883, *Jan.* 24. I first saw him. Occupied on the Thames as a bargeman. Seven years ago, the first attack of hæmaturia occurred: severe; the clots causing retention of urine. Several attacks, with rather long intervals, during the succeeding five or six years.

During last year more bleeding; during last month almost continuously seen. All this time he has worked hard at the oar; he bleeds less when resting, but has little pain; holds water two hours or more, night and day. Passes it sometimes quite clear at beginning of stream, ending deep red.

He is very weak, and obviously anæmic from loss of blood.

At this visit he passed in his urine a shred, which, under the microscope, proved to be a perfect specimen of fimbriated papilloma. Hence I decided at once to operate.

*Feb.* 8. Dr. George Johnson and others present. Found tumour: rather wide base, but prominent; springing from the back of the bladder a little on his right side. I nipped off all the salient portions, leaving a slightly projecting, ragged base. The tube was introduced; it remained five days.

*Feb.* 20. All urine still by wound; generally a little blood in the urine, which seemed to be checked by mild daily injections of perchloride of iron.

*March* 2. Up and going about. Very little bloodstain; urine partly passing by urethra.

*March* 12. No blood for a week; holds urine three hours. Walked an hour yesterday. All the urine by urethra.

*April* 3. Stronger than for months; has returned to his work.

*November* 1. Has been working hard all summer and autumn, and occasionally sees a little blood when work is severe.

1884, *April* 16. Called on me. Continues his work. No frequency of micturition; no pain; passed a little urine with faint blood tint.

Dr. Gibbes examined this tumour, and reported upon it as follows:—'This growth consists of a number of delicate filiform processes: each of these consists of a central stalk from which branch several secondary processes. They are formed of a very delicate connective tissue in the centre, which is infiltrated with small round cells; and they are covered with a stratified layer of columnar epithelium, which resembles that of the normal bladder. This epithelium is set on a nucleated basement membrane; a large blood-vessel enters at the base of each villus and branches as it goes on,



until it finally breaks up into a network of capillaries, which lie directly under the basement membrane. In some places these capillaries may be seen to have ruptured on to the external surface. The whole growth is very vascular. Many of the columnar epithelial cells are distended with mucus. In some of the processes there are crypts lined with columnar epithelium similar to that on the surface.'

Case 10.—J. S., æt. 53. Fibro-sarcoma, or transitional (?).

1881, *August* 24. I first saw him. Leading an active life; from Wales. Sent to me by Dr. Maguire, of Holyhead. Last six months, micturition frequent, little painful before and after, occasionally slight hæmaturia. Urine healthy, no organic deposit seen; under microscope a few blood corpuscles.

1882, *May* 8. He came up again. Slight advance in symptoms. Sounded: nothing felt worth recording; prostate rather full; blood little increased.

*August.* Pain increased slightly; a little florid blood lately seen at the close of micturition.

*November.* Pain increases; rarely three days without marked appearance of florid blood; appetite good; walks three miles, and thinks exercise makes little or no difference. Nothing characteristic in urine.

1883, *March* 2. The last two months blood has appeared every day, and passes water every hour day and night, with much local pain; none in legs or back.

*March* 3. Digital exploration. Mr. Coward and others present. Felt a large mass more than half filling the bladder, and much harder than growths usually met with. Was compelled to use the forceps with cutting edges, removing great part of it, bit by bit, with great care, examining afresh with the finger after every portion. Very free bleeding for twenty-four hours.

*March* 5. Blood diminishing. Weak. Abdominal tenderness.

*March* 6. Urine passes by tube freely; still bloody.

*March* 7. Died at noon.

*March* 8. Autopsy showed a portion of tumour about base remaining; of very firm consistence, and apparently continuous with the coats of the bladder. Both kidneys small and pale, the right showing marks of pyelitis.

Mr. Shattock carefully examined the bladder with a view to determine the connection of the growth with the organ, and reports as follows:—'A vertical section carried through the middle of the tumour and the wall of the bladder shows the morbid growth to be throughout solid, white, of soft consistence, and very evidently constructed of an alveolar stroma, from which the contained elements can be expressed. The growth nowhere extends through the wall of the bladder; the longitudinal muscle-bundles are traceable without interruption beneath its base, though the transverse are unrecognisable in the situation, a result due apparently to a displacement rather than to any proper disappearance from infiltration of the transverse bundles by the tumour.

'The deep limit of the growth is clearly defined, convex, undulatory or lobular in character; the tumour substance has nowhere extended laterally, its deep limit being in fact its narrowest part. The wall of the bladder beneath the tumour is folded inwards for a depth of nearly half an inch, a condition due, doubtless, to the enforced dragging of the growth upon the subjacent part of the bladder, as the connective tissue and fat lying over this spot are quite lax, and present no induration or cicatricial-like shrinking.

'A microscopic section shows throughout an alveolar stroma of connective tissue, the wide meshes of which are filled with multiform epithelial cells, many of an elongated form, columnar, pyriform, some with bifid tails, and arranged with the long axis at right angles to the wall of the space which holds them.



'Taking all the facts together, there is no evidence that the tumour is malignant.'

Case 12.—C. C. S., æt. 56. 'Transitional.'

1883, *January* 11. I first saw him. Habits sedentary. About a year and a half ago severe attack of painful micturition, followed by more or less irritation ever since.

Three months ago, first saw blood in the urine, after a long walk. Has recurred frequently since.

Now, there is considerable frequency of micturition, pain, and often blood. Sounded: nothing found; the bladder empties itself by its own efforts. Rectal examination reveals nothing; in the urine, no signs of tumour débris.

He returned to the country to carry out some treatment advised; but his symptoms becoming more severe, he came to town again.

*April* 3. Sounded and otherwise examined under ether: nothing discovered; a 'softish' feel in rotating the sound. Tried mild injections of perchloride of iron. He passed some small phosphatic concretions a week or two later. As he made no progress, I decided to explore with the finger.

*May* 4. The brother Dr. S., and others present. I found a broad sessile tumour occupying (his) right side of bladder; one which it was clearly impossible to remove, since its incorporation with the walls of the bladder was manifest. I nipped off two of the most salient portions of the mass, diminishing it considerably, and put in the tube. It remained two days, when all bleeding ceased. He left for the country, the wound being healed and symptoms relieved, on May 24.

1884, *May* 10. Came up again to see me, with much frequency and pain, but with little bleeding; troubles mainly due to some phosphatic deposits, which were removed by lithotrite and aspirator under ether; and he left again, relieved, but suffering much at times, on May 20.

Dr. Gibbes examined this tumour, and reported upon it as follows:—'This tumour appears to be an hypertrophy of the submucous coat of the bladder. The muscle appears normal, but the tissue inside it is composed of dense bands of fibrous tissue, which are irregular in direction, and which have here a macerated or sodden appearance, as if there had been great œdema into them. Nearer to the epithelium the fibrous tissue is much finer, and directly under the epithelium it has a reticulated appearance, exactly resembling granulation-tissue in the bottom of a healing wound. The epithelium on the surface resembles that of the normal bladder in every respect. The blood-vessels in the depths have very thick walls, and are surrounded with round cells in some places. The capillaries run directly to the surface, generally without branching, and are there ruptured in many places. They are also ruptured in some parts of the deeper tissue, and there are many spots of extravasated blood. There are collections of round cells, and numerous irregularly shaped large cells, in some places resembling "lymphoid" tissue, and these are arranged in round or oval masses.

'There are no papillomatous or "villous" growths in that portion of the tumour examined.'

The microscopic drawing, Plate V., was taken from the above described tumour.

# TABLE OF CASES OF OPERATION FOR VESICAL TUMOUR.