Preface.

The following thesis was written during the year 1854, at a time when I was suffering from organic disease of the chest, on account of which I had to leave Edinburgh for a warmer climate, before the completion of any classes. It was therefore quite impossible for me to bestow that amount of care and research upon the composition of it which was necessary, and which, under more favourable circumstances, I certainly should have bestowed. It was my intention to have completely revised
the subject of this Thesis and to have inserted some of the more important facts which have been lately discovered regarding the disease of which it treats.

After a recent return to this country however, I find my health to be still in a state that in no means admit of this, so I am forced to present it again without any alteration. I therefore trust that when the Members of the Medical Faculty are made aware of the many disadvantages under which it was written, they will have the kindness to deal as leniently as possible with its numerous defects.

John H. Reinde

March, 1857.
On granular degeneration of the kidney.

The history of the disease termed "granular degeneration of the kidney" or more commonly "Bright's disease" can be traced back for comparatively short period. Although its effects were long ago plainly visible, still the cause of these effects continued to remain a mystery to every member.
of the profession. To late as the year 1837. C. Bright, after a careful series of investigations, first made the important announcement that dropsy frequently depends upon a peculiar degeneration of the kidneys, which is made known by the presence of albumen in the urine, and that this diseased condition of these organs is accompanied by a remarkable susceptibility to many other diseases, especially of an inflammatory nature. Before this time however, physicians
were in possession of certain facts which had they been thoroughly examined, might have gone far towards the discovery of the general principles first laid down and established by Dr. Bright. Since then, this disease has been made the subject of more minute research by several very accurate observers, amongst whom the names of Christison, Solomon, Rayer, Osborne, Johnson, and Gardner, Simon, &c., deserve special mention. Through the labours and perseverance of these inquirers we have now
Fortunately acquired a very intimate knowledge of the nature of a disease, which, in account of the frequency of its occurrence and often fatal effects, ought to be fully understood, and the discovery of which cannot fail to reflect lasting credit upon its talented discoverer. Whilst, at the same time, it must tend in no small degree to advance the science of medicine.

For the purpose of more fully comprehending the exact nature of the changes presented to us from
Examination of the kidney after death it will be necessary to make a few remarks upon the anatomical structure of the organ in a state of health.

Anatomy,

Each kidney consists of numerous secreting tubes collected into from eight to twenty separate conical masses which together constitute the internal or medullary portion of the gland. These tubes open by free extremities into a cavity called the 'pelvis' of the kidney.
which leads to its secretory duct. When traced in an opposite direction, these tubes are found to bifurcate again and again at very acute angles, and take a nearly straight, though somewhat divergent course towards the surface of the organ. As they approach the surface they become convoluted in a most intricate manner and either end in dilated blind extremities, or bear small flask-shaped sacculi upon their walls which sacculi have received the name of capsules of Malpighi.
These bearing lateral dilatations are thought either to unite in loops, or to terminate in simply closed extremities. These tubes are of greatest size near their orifices; their diameter varying from \( \frac{7}{8} \) to \( \frac{1}{4} \) the part of an inch, but farther on they become smaller, measuring about \( \frac{1}{8} \) of an inch in diameter, after which they do not diminish much until entering the cortical portion, where they vary somewhat in size but still retain about the same average calibre as the straight tubes. Upon
examination, they are found to consist of a primary or basement membrane, cloaked internally by a spheroidal epithelium and on the outside by a network of capillary blood vessels. It is believed that these tubes are possessed of an inherent elasticity by means of which they are enabled to enlarge or contract as circumstances may require.

It is stated by P. Johnson that each epithelial particle contains a minute quantity of oil— in this respect resembling the cells of the
healthy liver. The branches of the renal artery are found passing up amidst the cortical substance existing between the tubular masses, where frequently dividing until they reach the outer cortical portion, they there ramify and give off many delicate branches which have with few exceptions a peculiar arrangement, forming what are called Malphighian Corporoles. These bodies consist of one of the minute arteries coiled up and embedded in one of the dilatations of the urinary tubes and from
which proceeds another small artery ending in the proper capillaries of the organ.

Prof. Gordon and others have described a fibrocellular matrix existing throughout the entire structure of the gland, whilst by other anatomists no such distinct substance is thought to exist.

Morbid Anatomy.

The anatomical characters proper to the disease now under consideration are found to vary very considerably in different cases, but nevertheless denote that the minute structure
of the gland has been the seat of some important morbid alteration. Several forms of the disease have been stated to exist and have been pointed out by different authors. By C. Bright, it has been divided into three different forms, by Slocum into five, and by Rayer in six. It has been made a question however, whether the various appearances upon which these divisions have been founded are characteristic of different morbid conditions, or merely different stages of the same morbid process. The weight of evidence seems strongly
opposed to the latter view, since the great difference in size and consistence displayed in the organ, as well as the more intimate revelations of the microscope, would seem to prove that two or more distinct forms of the disease do actually exist. To facilitating the description of the morbid appearances presented to us in the organ—it will be necessary to divide the progress of the disease into three stages, viz. Incipient, Middle, and Advanced. In the incipient stage, the appearances presented are found to differ according as the disease was
assumed the acute or the chronic form. In the acute form the kidneys are found to be much larger than natural, and sometimes as much as four times their natural weight. They are also flabby and friable and appear externally of a dark colour marked with ecchymosed spots. When cut into, the blood drops freely from them, and the cut surface presents a very dark red or even purplish color—not nearly uniformly diffused with usually tuft like spots having a still darker color scattered up and down which spots have been ascertained to be Malpighian
bodies turgid with blood. The cortical portion of the organ is discovered to have been chiefly and in some cases alone the seat of disease, but sometimes this congested state of the organ exists throughout its whole extent. The cortical portion is considerably broader than natural, and granular matter is often found deposited among the other textures. When the disease has assumed the chronic form from the first, the changes which take place in the organ have been very ably described by Dr. Johnson, Mr. Simon and others. Dr. Johnson has pointed
out that one form of Bright's disease is characterized by a
worsened increase of fatty matter
within the epithelial cells lin-
ing the efferent tubes.
In account of these enlarged
cells being thrown off in large
quantities, the tubes become at
length completely blocked up.
And by their continued pressure
upon the capillary pleura
surrounding them, cause di-
latation of the Malpighian
corpuscles, and sometimes even
rupture of the delicate vessels
of the organ. It is quite
certain however, that this
disease may exist, when no
morbid deposition of fat can be discovered in the kidney.

Mr. Simon has pointed out that the secreting function of the kidney may be morbidly increased, in consequence of some noxious material existing in the blood. This "materies morbi" will not infrequently be found to be the result of some derangement in the function of digestion — such as the lithates or malates, or perhaps it may be matters cast upon the kidneys in consequence of some obstruction to the proper performance of the functions of the skin or liver. Occasionally also it may be the peculiar
poisons of typhus or scarlatina. Whatever the cause may be, an increased action is excited in the organ—whereby a chronic inflammatory process is lighted up in it. The secreting cells are then thrown off before they are fully formed and not being properly eliminated fill up and distend the tubules. If a diseased portion be examined by the microscope at this period, the tubes will be found to be firmly plugged up by their morbid secretion which may consist of pus globules, healthy cells, amorphous matter, crystals of lithic acid or...
scabrate of lime. Coagula of blood may also be found mixed up amongst the other matters.

In the middle stage of the disease, when the morbid deposit has become considerable, the natural structure of the organ is found to have more or less completely disappeared; the kidney is occasionally of the normal size, sometimes it is enlarged, very rarely is it much smaller. When enlarged, it is generally softer than usual, when smaller, it is generally rather hardened. When the investing membrane is stripped off, which in general is easily
accomplished, the surface is ten
motheled, or stained, of a greyish-
yellow colour, with dark or
purple patches interspersed.
Sometimes the whole surface
presents a pale aspect, but more
generally it exhibits a variety of
colours. Often also it is variegat-
ed with little star-like spots or
streaks which are found to be
portions of vessels containing
blood, and in many instances
it is uneven or rough from little
prominent grains scattered over
it, but occasionally it is found
to be quite smooth. When the
organ is divided by a longitudinal
incision, we find a marked
alteration in its natural texture. The cortical portion is the part chiefly affected—sometimes it is much broader than natural; sometimes it is narrower. Its colour is also greatly changed. Instead of being uniform throughout, it is often pale and its natural throes are broken up and obliterated. Sometimes its surface is more or less granular in texture—often occasionally reddish spots scattered over it. When the gland is injected, the matter does not appear to penetrate the cortical portion. The texture of the cortical portion may be far advanced in disease and even entirely disorganised.
whilst the tubular portion is little if at all affected. Sometimes however, the outer ends of the tubular masses are found diseased, before the natural stride of the cortical portion have become wholly obliterated.

In the advanced stage of the disease, when the tubular masses have become more or less disorganized, the kidneys are in some instances found to be considerably larger than natural, but more generally they are found to be shrivelled and contracted, and in some cases they do not weigh more than one eighth part of their natural weight. Dr. Bright has noticed cases in
which the texture of the kidney was almost as hard as cartilage. The surface of the organ is usually of a pale colour and frequently finely granular, also it is occasionally marked by linear depressions and sometimes it is lobular or even botryoidal. When the organ is divided longitudinally the natural structure of the cortical portion is found to have almost wholly disappeared and the tubular portion is often greatly broken up or otherwise rendered incapable of properly performing its natural function. In the fatty form of the disease, the greater number of the tubes of the pyramids
are frequently completely blocked up by the morbid deposit part of which may have been carried into them from above and lodged there, and part may be the epithelial particles cast off by the tubes themselves. It is extremely probable that the tubular portion may assume more activity in its secreting function in consequence of the destruction of the cortical portion, and thus lead to engorgement of the tubuli.

These distended tubuli again pressing upon the surrounding parts, and more especially upon the blood vessels, may diminish or wholly obliterate their canals.
and thus lead to atrophy and con-
traction of the whole gland.

In some cases of fatty degeneration,
however, the organ may be much
increased in size. In consequence
of the large accumulation of fat
in the tubes, Dr. Johnson is of
opinion, that where the kidneys
are much enlarged from fatty
degeneration, the disease has
generally run a rapid course,
and that from inability of the
organ to perform its proper
office, death has ensued before
sufficient time has elapsed for
atrophy of the organ to take
place. The fatty form of the
disease is not unfrequently
accompanied by the inflammatory
and their conjoined effects may
be witnessed in the same kidney.
When the disease has assumed
the inflammatory form, the tubuli
are found blocked up with ex-
uded fibrine, and cast off
epithelial particles. Very often
the tubuli are ruptured, and
their fragments disseminated
circularly throughout the gland.
In many cases the arteries are
almost wholly obliterated, and
in some cases the veins issuing
from the organ are firmly plugged
up with coagula of blood.
In those cases in which the
whole structure of the gland is
destroyed, the ureter is also often rendered impervious. In some instances we find small cysts or cells containing thin transparent liquid scattered irregularly throughout the organ, both on its surface and in its interior. Considerable difference of opinion has existed among authors as to their exact nature, and the manner in which they are formed. C. Johnson is of opinion that they are simply dilatations of the urinary tubes after their epithelial lining has been cast off. He states that in consequence of the urinary tubes being blocked
up by morbid deposit, the watery portion of the urine which, according to Mr. Bowman is secreted by the Walspighian corpuscles, is unable to pass freely along, and consequently by its accumulation produces dilatation of these tubes.

In general we find the right kidney in a more advanced stage of disease than the left—sometimes indeed one may have it's structure almost wholly destroyed—while the other may not have passed beyond the middle stage.

In regard to the morbid appearances presented to us in other organs of the body, much variety exists in different cases.
Instances have occurred in which all the internal organs, with the exception of the kidneys, have appeared perfectly healthy, but examples of such cases are but rarely witnessed. In the great majority of cases there is found more or less disease of other organs also, but many of such morbid appearances depend upon the number and severity of the secondary affections, which so frequently originate during the progress of the primary disorder.

Among the most frequent occurrence of these appearances may be mentioned. Serous effusion into the cavities of the
pleura, pericardium, and peritoneum also more or less effusion into the subcutaneous areolar tissue and into the cellular structure of the lungs, producing aedema of these organs. In many cases also, there are layers of plastic lymph adhering to the inner surfaces of the pleura, pericardium and peritoneum, with a turbid or milky fluid within these cavities, thus denoting previous inflammation of the lining membranes. The lungs may be infiltrated with blood or some portions of them may have become completely
hepatized. The structural changes observed in the heart consist chiefly of hypertrophy and dilatation, with or without valvular disease. Out of 52 cases of hypertrophy of this organ examined by Dr. Bright, no valvular disease could be detected in 34, but in 11 of these 34, more or less disease was discovered in the coats of the aorta, thus leaving 23 in which no apparent cause of hypertrophy could be discovered. Dr. Watson is of opinion that such cases may be accounted for by supposing that the greatly imparished
state of the blood which accompanies the renal affection, induces debility of the muscular structure of the heart, and thus leads to dilatation of its cavity, with subsequent hypertrophy of its walls. Disease of the liver, especially fatty degeneration of that organ is of very common occurrence in connection with this disease. J. Johnson believes this form of hepatic disease to occur more frequently in connection with renal disease than with tubercular disease of the lungs. Out of 21 cases examined by him, 14 were found accompanied by disease of the
Kidneys, whereas only occurred in connection with tubercular disease of the lungs. Occasionally there is more or less redness, and other signs of recent congestion or inflammation of the mucous membrane lining the bronchial tubes—and in some cases the lungs are found to be in a state of emphysema.

The mucous membrane of the intestines is also in many cases found to be in a diseased condition, being in some cases merely congested—whilst in others, its glands are enlarged—and sometimes ulcerated. Occasionally indeed, very extensive ulceration of the mucous coat may have existed.
which in some instances may be found to have extended throughout the greater part of the large intestines.

Symptoms.

We now proceed to notice some of the symptoms by which Bright's disease may be recognized. They may properly be divided into two classes.viz. those which belong to the primary affection and those which denote the presence of some of the secondary disorders which so frequently accompany the original.

Leaving the consideration of the latter however for the present, we
will endeavour to notice some of
those which are essentially depend-
dent upon the primary disease.
When the disease assumes the
acute form, its symptoms are—
generally well marked, and often
urgent. Frequently after having
been exposed to wet or cold, or
some such exciting cause, the
patient becomes feverish, which
state is often preceded by rigors,
this is accompanied by weariness
and dull pain in the limbs,
nausea and vomiting. Along
with these there is a frequent
hard pulse, heat and dryness of
the skin, restlessness, loss of
appetite, thirst and headache,
The secretion of urine is very scanty, sometimes altogether suppressed, and it is more or less impregnated with albumen, occasionally it is coloured with blood, and in some rare cases it contains clots of blood. Very commonly there is a frequent desire to pass urine, with in certain cases pain in passing it. The patient complains also of dull pain in the lumbar region which sometimes shoots down to the groin or testicles, occasionally he complains of pain at the pit of the stomach, felt only on pressure or increased by it. These symptoms seldom continue
long until others begin to make their appearance. In most cases not more than two or three days have elapsed until there is added sudden and general anasarca, or what is commonly known by the name of inflammatory oedema. If the disease be allowed to go on without any system of treatment being adopted death may take place by coma with or without convulsions or from some internal disorder such as pleurisy pneumonia pericarditis or peritonitis. Not uncommonly however under active treatment the disease may be altogether
checked in this stage, but more generally perhaps the symptoms above described gradually dwindle down, and assume those proper to the chronic form of the disease.

In some cases several of the symptoms, enumerated, may be entirely absent, dropping in many cases following closely upon a fit of shivering. In many cases also in which the acute symptoms have been developed, it will be found upon inquiring into the history of the case that the disease has existed for several months before in a chronic form. The symptoms belonging to the chronic form
of this disease are precisely the same in kind as those we have described as characterizing the acute form, but mitigated in degree. In some cases the chronic is merely the sequel of the acute form of the disease. But more frequently perhaps it commences slowly and insidiously, without the patient being at all aware of its presence. In this way it may continue for many months, without any very striking symptoms, until after a time, gradually increasing palor, emaciation and debility, clearly prove to the patient or his friends, that he is laboring
under some peculiar form of disease. Upon the patient being strictly interrogated at this period, it will generally be found that he has previously been troubled by a frequent desire to pass water, especially at night when in the horizontal posture, that his urine has been for some time scanty, or perhaps it may have been passed in too large quantity, and that occasionally it has been of a cherry red or brown colour, from its containing a little blood.

In many cases also the patient complains of obscure pains in the loins, increased by pressure
and occasionally extending along the thighs or to the scrotum, 
The urine is often of a pale colour and frequently muddy, 
of a low specific gravity, and coagulable more or less by heat 
and nitric acid. The skin 
is generally dry and the patient is often thirsty. The strength 
is also considerably reduced and there is more or less emaciation. 
There is paleness of the complextion, which in the majority 
of cases assumes a peculiar dingy or watery hue. and there is 
often a tendency to drowsiness. The digestive organs perform 
their functions very imperfectly.
This causing the patients to suffer much from dyspepsia, which state is frequently accompanied by sickness and vomiting. Upon examination, the blood and urine will be found to have departed greatly from the state of health. But as the abnormal condition of these fluids forms a very important part in the train of symptoms, and also assists materially in discovering the progress the disease has made, we will again consider them a little more in detail.

It would be very difficult indeed to say how long the disease may remain in the quiescent state.
without causing any very urgent symptoms. When the patient is not exposed to many of the direct exciting causes of the disease, the symptoms may remain in the latent state for months, and indeed not a few cases have been recorded in which they have existed for many years. When, however, any exciting cause is applied, and that cause may in many cases appear but slight and unimportant, the germs of the disease are roused into action, and acute symptoms are immediately developed, or as not infrequently happens, some secondary affection arises which.
may prove quickly fatal.

It is worthy of remark that of all the symptoms detailed, none have any especial reference to disease of the kidneys except the nocturnal micturition and the state of the urine, in truth they are only what may be called indirect symptoms, and may be found to exist along with many other diseases. The morbid condition of the urine, and more especially the presence of albumen in that secretion, furnish the only direct symptom by which the primary and fundamental organic affection may be recognised.

On this account, it becomes a...
matter of great importance to possess a correct knowledge of the means by which albumen may be detected. Third albumen, of which we have a good example in the white of eggs, begins to pass into the solid state at the temperature of 160° F, when largely diluted. It may require a heat of 212° F for its thorough coagulation. In testing urine which contains albumen, upon heat being applied, it first becomes hazy and then distinct white flakes are formed. But the urine is sometimes muddy when voided, in consequence of its containing a quantity of fine
light particles which consist of the altered mucous of the bladder and when this is at all considerable it is advisable to filter the urine before being tested. The haziness produced by heat increases according as the proportion of albumen in the urine increases. In some cases the tested liquid is changed into a gelatinous mass, but this does not occur very frequently. Heat alone however is not a conclusive test, as albumen may be present in the urine, and still not be detected by it, also under certain circumstances it may produce an appearance of albumen when
none exists. Healthy urine, as is well known, shows an acid reaction when tested, when it contains albumen. It is often less acid than natural, and in some cases it may be neutral or even alkaline when first discharged, and it may become alkaline from decomposition after it has left the bladder. In any case when the urine is either neutral or alkaline, heat fails to detect the presence of albumen—even in cases in which it is present in very large quantity. The reason appears to be this—the alkaline reaction of the urine is caused by the presence of ammonia, of soda
and the compounds which albumen joints with these alkalis are not coagulable by heat. The addition of nitric acid however at once remedies this defect, for as soon as it is added, there is a copious precipitate formed. If albumen be present in any considerable quantity, again when there is a flaky precipitate formed in wine which contains no albumen - as does sometimes happen, the fallacy may also be detected by the addition of nitric acid. For as this appearance is produced by the earthy phosphate, they are speedily dissolved by the acid, and the urine is thus rendered
clear. Thus then we perceive the advantage of testing with both heat and nitric acid in all cases, but in using the acid test, there is danger in using too little—so when enough and no more of the acid is added, then will combine with the albumen present. The compound resulting from this union is soluble in water and is not coagulable by heat—so in such a case, no precipitate will be formed. This compound however is insoluble in diluted nitric acid, consequently whenever a little more acid is added than is sufficient to form this compound, the albumen is
immediately brought into view.
Several other chemical tests have been recommended, such as creasote, ferrocyanate of potash, corrosive sublimate, and muriatic acid, but they are unnecessary as the two first mentioned may generally be readily obtained and when carefully applied are quite accurate. Besides they are free from fallacies to which the others are occasionally liable. Although the condition of the urine during the whole progress of this disease is essentially morbid, still it is found to vary according to the stage of the disease and also according as this has assumed
In the acute form it is generally diminished in quantity. Although in some rare cases it has been found to be increased.

Instead of passing about forty ounces—which may be reckoned somewhere about the average quantity passed by a healthy man in twenty-four hours—

the patient only passes about sixteen, twelve, or eight ounces, and in some cases to little as three. Sometimes indeed the secretion is entirely suppressed, and then head symptoms soon show themselves. As before stated, the secretion has an
unnatural appearance, it may be red or dark, or it may have a strong resemblance to muddy beer, and when air is blown into it through a tube, a quantity of bubbles are formed, like those in soapy water.

When the urine is allowed to stand for some time, a sediment forms, consisting generally of lithic acid or the lithate of ammonia, but this is easily redisolved again by the application of heat, lower than that required to coagulate albumen. Occasionally also a sediment of the earthy phosphate has been observed, but this is
rarely the case, except in urine which has undergone putrefaction from being long kept, and it has been noticed that urine is more apt to decay when in this morbid condition than when healthy. The quantity of albumen which may exist in the urine is various, but in the early stage it is generally abundant. As the disease advances however it becomes gradually less and less, and in some instances it has been noticed to disappear entirely. But this rarely happens in the early stage of the disease, although it has been known to do so.
In the commencement of the disease, less than ten parts in one hundred by weight of albumen is seldom met with, and the proportion is frequently much greater.

A very important question here arises—viz., does the presence of albumen in the urine invariably indicate the presence of Bright's disease? To this we would at once reply in the negative. Albumen may be detected in the urine when, from any cause, there has been a discharge of blood from the kidneys or bladder, certain articles of food such as cheese, pastry, and other indigestible substances have a similar
effect of causing albumen to appear in the urine. The same state of the urine has been brought on by the application of a caustic blister, and during the constitutional action of mercury. Albumen has also been detected in the urine of females during pregnancy, during the crisis of some febrile disorders, in cases of disease of the heart, and in delirium tremens.

As already stated, albumen has been noticed to disappear from the urine altogether for a short time. It has been seen to vanish for some hours after the application of the hot air bath.
and after severe purging by aperients. When therefore albumen has been detected in the urine of a patient, it is necessary to take other circumstances into consideration before we can be fully certain that Bright's disease does actually exist. Thus in the first place, by frequently testing the urine, we find out whether the albumen be constantly present or not.

We may also judge from the quantity of albumen which is present. For when the quantity is very large, we may suspect that the disease is only about its commencement - at least
that it has not become far advanced. But the urine displays another remarkable character in this disease. Its specific gravity is greatly altered. By Dr. Pont, the specific gravity of healthy urine is stated to range between 1015 and 1025; now in this affection it has been noticed as low as 1004, and its mean specific gravity may be reckoned about 1013. The density of urine of course depends upon the proportion of solid matter therein contained. When the watery portion is increased the density is diminished, but in this disease when the watery portion is in
small quantity, the density is frequently diminished also.

But since we find that in addition to the natural solid constituents of the urine, it contains albumen, it necessarily follows that those solids must be present in smaller quantity than natural.

The quantity of solid ingredients in healthy urine is about 65 or 68 parts in 1000. They consist chiefly of urea and certain other salts, the proportion of which, in this disease, is occasionally as low as 12 or 14 parts in 1000, and it has even been noticed as low as 6.

It was suggested by Sloth and others, that the albumen...
might take the place of the aorta, naturally existing in the
wrist, as the one by a slight alteration of its elements might
be converted into the other.

Christian has proved that this is not the case, as he
has noticed that in cases in which albumen was present in large
quantities the aorta was plentiful, and in cases in which it was
small in quantity the aorta was deficient, also. The aorta,
which ought to be secreted by the kidneys, is retained in the blood
where it may be readily dis-
covered, and thus acts as a poison upon the whole system.
As the disease becomes advanced, the quantity of urine passed is frequently not below the natural standard. In some cases indeed, it is greater in quantity than natural, and constitutes one form of chronic diuresis—which is sometimes called "diabetes insipidus." The urine is generally pale, slightly opaque, and of low specific gravity. Albumen is present, but often in small quantity, and it may be altogether absent in the last stage of the disease. When the urine is examined by means of the microscope, it is often found to contain fibrinous casts of the
urinary tubules, many of which are broken into small fragments.

In the fatty form of the disease, it contains a considerable quantity of oil globules, besides epithelial cells, many of which are dentsed with oil. Whilst these changes are taking place in the urine, the blood also undergoes a material alteration. In the acute form of the disease, and when it has been of short duration, the fibrin is increased, and the blood presents a well-marked buffy coat. There is a great reduction however in the density of the serum, its average specific gravity in health is about 1024.
but in this disease, it may fall so low as 1020, or even 1013. This reduction is principally caused by the loss of albumen.

The average quantity of albumen in healthy blood being from 65 to 69 parts in 1000, but in this disease it has been found reduced to 10 parts. Now the very interesting fact has been made out by Dr. Blundell that the more albumen the urine contains, the less there is existing in the blood, and the lower is its specific gravity.

When the disease has made some considerable progress, the serum again acquires nearly its natural density, in consequence of the diminished
quantity of albumen in the urine.

The colouring matter of the
blood, or hematoxin, is very greatly
reduced in quantity, and this
reduction rapidly increases as
the disease advances. The
proportion of hematoxin in healthy
blood is about 1335 parts in
10,000, but in this disease it has
been found reduced to 427 parts.
This accounts for the peculiarly
pale and dingy aspect, which
almost invariably marks the
victims of this disease.

We now proceed to enumerate
some of the secondary symptoms
of this disease, and these we
may state are of very great
practical importance, as it is
generally by observing some of these
that our suspicion of the primary
disorder is first awakened.

It is very seldom, if ever,
that the disease runs its course
without some of these secondary
symptoms showing themselves.

And besides many of these place
the patient's life in the greatest
danger, or as is often the case
rapidly bring it to an end.

Of all these—dropsy is the
most frequent, and practically
the most important, as much
as it is one of those complications
over which we have most control.

In general when dropsy first
makes its appearance, the skin is dry and the urine scanty, and the quantity of fluid in the subcutaneous areolar tissue is observed to diminish or increase according as the urine is secreted in greater or less quantity.

It is probable that the tendency to watery effusion through the coats of the blood vessels is caused partly on account of the insability of the heart to keep up a vigorous circulation, and partly on account of the watery condition of the blood, which is such a constant accompaniment of the primary affection. Patients labouring under general dropsy, are
usually troubled with shortness of breath and palpitation of the heart, with a sense of suffocation when they attempt to assume the horizontal posture, also by tightness across the epigastrium and occasionally by drowsiness.

When the renal disorder assumes the acute form, the dropsy often shows itself early, or it may suddenly arise from some febrile action being excited in the system when the chronic form of the disease exists. It also very frequently follows an attack of scarlatina.

Nearly all dropsies may be arranged under two great divisions, viz. Cardiac and Renal, both
of which may happen to be present in the same patient at the same time. Although the general appearance of these two kinds is much the same, still it is of importance in regard to the treatment of each that we should be able to distinguish the one from the other. In this we are somewhat assisted by noticing the general appearance and complexion of the patient. When droopy depends upon disease of the heart, the cheeks and lips are often purplish or bluish; sometimes fluid — whereas when it depends upon disease of the kidneys there is a great deficiency of red blood.
in the capillaries. We may also judge from the previous history and habits of the patient but certainly the most conclusive evidence of the renal affection is to be derived from the state of the urine. Leptoperit is another very common secondary affection and in point of frequency of recurrence perhaps equal to dropsy. The most serious consequence of this is chronic vomiting which is often a great source of distress to the patient, particularly in the advanced stage of the disease. Sometimes indeed vomiting causes death from exhaustion. Diarrhoea is a common complication
and is sometimes induced by errors in diet, but much more frequently it is caused by ulceration of the intestines. In many cases it appears to ward off the diarrhœal effusion by creating an increased discharge of fluid from the bowels, but at the same time it proves very exhausting to the patient, and not infrequently the cause of death. The serous membranes are very liable to become inflamed. In point of frequency—pleurisy is the most common, next to this is peritonitis, and next pericarditis, the last of which is very rare. When compared with the others,
Stupor is of frequent occurrence, and often obstinate. Coma and apoplexy are among the most unfavourable of the secondary affections, and unfortunately of frequent occurrence. Sometimes the patient becomes suddenly comatose, but more commonly coma comes on gradually and insidiously, several days elapsing between the period of its first appearance and its too general and fatal termination. Coma and death, in the latter cases, are believed to be caused by the poisonous influence, used when retained in quantity in the blood, possesses over the brain,
As frequently occurring along with this disease, also may be mentioned, chronic rheumatism, and organic diseases of the heart and liver.

Causes.

The causes of Bright's disease are often enveloped in considerable obscurity. In the acute form of the disease, the symptoms often first appear after some unusual exposure to cold and wet, and in general indeed the patient is aware of no other cause. In some of these cases however, perhaps not a few, the disease may have
existed in the latent state for some time previous. Out of 36 cases observed by Dr. Ebenezer no fewer than 32 of these showed their first symptoms after some exposure to cold. Sloan has recorded 4 cases in which the patients ascribed their complaints to the effects of blows upon the loins. In a great proportion of cases of a chronic nature the disease comes on insidiously, without any direct exciting cause being applied, appreciable either to the patient or physician. The chronic form also frequently occurs in persons who have suffered previously
from an attack of what is termed "bilious dyspepsia," and who had apparently recovered. In many of these cases, however, there is a strong probability that the recovery had been only imperfect, that on account of the skillful treatment employed at the time the disease had become calmed down, but still existed in the latent form—ready to be developed upon the application of some fresh exciting cause. It is also supposed that in all cases there must exist some deformed state of the general constitution or some other predisposing cause.

Intemperance appears to be one
of the most common of all predisposing causes and on account of the stimulating effect of ardent spirits upon the kidneys, it is very probable that it may act as an exciting cause also. Nevertheless it must be remembered that the disease sometimes occurs in individuals who have all along led strictly temperate lives.

The scrophulous diathesis appears to be a predisposing cause of this disease, although this has been doubted by some authors from the frequency of its occurrence, however in patients in whom the marks of the
profusious constitution plainly show themselves, there is a strong probability that such individuals are rendered more subject to this affection than those in whom no such taint exists.

From the frequency of this disease following an attack of scarlatina - that may also be classed among the predisposing causes - it is, not amongst the exciting. The disease may occur at all ages. But it is less common in extreme youth than at a more advanced period of life. A case is recorded in which the disease unequivocally showed itself in an infant seven-teen months old - but it occurs
most frequently in adults—probably not from any peculiar liability of the kidneys to become diseased inherent in itself at this period, but on account of the more frequent exposure to exciting causes. A like reason may probably begin for this disease showing itself more frequently in males than in females.

**Prognosis.**

In forming a prognosis of this disease, we must take into consideration the amount of injury done to the healthy structure of the kidneys, and also the nature and severity of the secondary affections.
When the secreting structure of the glands is much broken up and destroyed, complete recovery cannot be expected, but in the early stage of the disease, and when it has assumed the acute form, complete recovery from all the symptoms may certainly take place. In cases of inflammatory dropsy with albumen, following diuresis, recoveries seem to be common. In the fatty form of the disease, there is much less chance of recovery than in the inflammatory. But although it may be beyond our power to restore a kidney far advanced in granular degeneration to its natural condition, still we
are able by means of careful and judicious treatment to keep the patient alive and even in a state of tolerable health. It may be for a considerable length of time.

It would appear also that complete recovery from all the symptoms of the chronic form of the disease does occasionally take place.

In such cases we may suppose that the disease has been situated in a portion of the gland only and although that portion of the gland may have been rendered completely useless still that a sufficient quantity of sound structure remains to supply the wants of the economy. When
ertain of the secondary affections show themselves, our prognosis must be much more guarded. Since some of them are immediately dangerous, and most of them are obstinate.

Coma is one of the most dangerous complications and is seldom recovered from. Diaphyse is not nearly so unfavourable. Diseases of the heart and liver are of unfavourable import, and may occasion much distress. Not only being in themselves highly dangerous but also on account of the evil effect they may produce upon the previously existing renal disease.

Although the urine contains a large quantity of albumen still the patient may recover as that
ingredient is generally present in
largest quantity in the early
stage of the affection. Most
danger is to be apprehended when
the density of the urine is very
low and at the same time the
quantity secreted is very small.
On the other hand a gradual
increase in both density and
quantity is a favourable symptom.
But when total and continued
suppression of urine takes place
the case soon terminates fatally.
Success in the advanced stage
is generally a favourable occurrence.
As the looseness in density of the
urine at this period may be
made up for by the large quantity
secreted and thus nearly a normal amount of solid matter may be daily discharged.

Treatment.

We now proceed to make a few remarks upon the treatment of this disease, and in doing so we will first consider the treatment proper for the renal affection and afterwards that most suitable for some of the secondary affections.

In treating the primary affection our treatment must be regulated according as we have to deal with the acute or the chronic form of the disease. In the acute form active antiphlogistics are clearly
indicated, so as to subdue the inflammatory process before any material injury has been done to the structure of the gland.

With this end in view then, general bloodletting—when the constitution of the patient will bear it—ought to be immediately adopted. This should be carried so far as to alter distinctly the character of the pulse—and at the same time to produce a marked effect upon the general system. Bloodletting may be repeated again and again, when the constitution of the patient and the advance of the disease render such a proceeding warrantable. When the face of the
circulation has been in some measure subdued. Great relief will in most cases be obtained from local bloodletting, either by means of leeches to the bone or by cupping. After both general and local bloodletting have been carried to their full extent, many of the symptoms will occasionally be greatly mitigated. The pain and febrile symptoms will be greatly subdued, and the condition of the urine will frequently approach much nearer to its natural standard. Its quantity is often increased and the albumen may in a great measure disappear.
But before adopting this rigorous mode of treatment, it will always be prudent to inquire into the previous history of the patient, and by a careful examination of symptoms, seek to ascertain whether or not the disease has existed in the chronic form for some time before. In cases in which we find the disease in an advanced stage, and in which we believe that the gland has become considerably disorganized, such antiphlogistic measures must be adopted as the constitution of the patient will bear. Generally in such cases we find that the blood has become greatly impoverished, and has lost so large
a proportion of its colouring matter, that general bloodletting would
produce a state of extreme exhaustion
and bring the patient into eminent
danger of death by syncope.
The patient ought to be kept in
bed and particular attention should
be paid to the function of the skin,
for, as before stated, suppression of
its secretion, will in many cases
he found to have been the original
exciting cause of the malady.
After the febrile symptoms have
in some measure abated, great
benefit will often be derived from
the use of the hot air bath, which
in many respects is preferable
to the warm water bath, as it
can be applied with but little trouble when the patient is in bed and thus greatly lessen the hazard of subsequent exposure to cold. Rocc's powder may also be administered in small doses three times a day. The beneficial effects of diaphoretics have been particularly noticed by Bellhouse. He states in regard to his own patients: 'that whenever general perspiration came on either spontaneously or in consequence of medicine, then the cases always terminated favourably.' Due attention should likewise be paid to the state of the bowels as they generally become constipated.
under the continued use of the powder. Great objections have been brought forward to the use of diuretics on account of the stimulating effect they have upon the kidneys, as it has been thought that they accelerate the inflammatory process within these organs.

By others again it is held that such increased inflammatory action and consequent disorganization does not necessarily follow and that diuretics are occasionally of great service in treating some of the secondary affections.

So Christian states that the albumen in the urine may be considerably diminished in quantity or even...
In some cases it may entirely disappear during the action of diuretics. The use of mercury has been prohibited by most physicians except in very guarded doses on account of the very silent action it generally exerts upon the mouth and which, when fully established, is very difficult to subdue. As Bright remarks, however, that it may be found to be of service in the early stage of the disease—when given in combination with antimony and opium. In many cases also it will be advisable to produce and keep up a discharge from the loins by means of fomentations or
itour, and this will in many instances be found more suitable than repeated local bloodletting.

During the continuance of the acute symptoms the diet must be low and all spiritsuous liquors ought to be strictly prohibited.

When the disease has assumed the chronic form from the first or when it has followed an acute attack and subsequently been advancing in a latent form, active remedies are uncalled for. In such cases small doses of antimony may be given, and the function of the skin kept up by repeated small doses of Siers powder. The bowels must also be regulated.
The body should be strictly guarded against the effects of cold by means of a sufficient quantity of clothing. The patient should be kept constantly clothed from head to foot with flannel, and he should be particularly cautioned against exposure to the inclemencies of the weather. Benefit will also be derived from the occasional use of the warm bath. The diet of the patient should be nutritious and capable of easy digestion; every article of food which causes derangement of the stomach being strictly avoided. Regular exercise should be taken in the open air, but not
so much as to cause fatigue or exhaustion. By moderate exercise considerable perspiration is generally induced, and when this happens the greatest care should be taken to avoid cold afterwards. In the fatty form of the disease it has been stated by some authors that the patient should abstain from every kind of fatty matter of diet. As the disease is in many cases connected with the serofulose diathesis however, the propriety of this mode of treatment may be questioned especially when we consider the great benefit derived from the use of cod liver oil in stenous diseases generally.
In many cases when the patient is enjoying a tolerable share of health, it will often be difficult to enforce the strict observance of these rules. But when this can be accomplished, life may be preserved for a considerable length of time, even in cases in which the kidneys have undergone very great structural change.

We will now shortly consider the treatment most suitable for some of the secondary affections. We will first make a few remarks upon the treatment of droopy, when caused by this disease, and from its frequency of occurrence, the proper mode
of treating it, becomes a matter of great importance. When the dropsical accumulation has occurred suddenly, and when it is accompanied by much febrile disturbance, great relief is in many cases obtained from free bloodletting, and when there is pain in the joints it will be alleviated by cupping. When an acute attack of dropsy has come on in the advanced stage of the disease we must be very cautious in abstracting blood, as in most cases the patient is unable to bear any considerable amount of depletion. After the acute symptoms have abated, the
Function of the skin must be kept up by means of diaphoretics. Great reliance has been placed by several authors upon this mode of treatment and there can be little doubt that in many cases it is of great service. Purgatives will in many cases reduce the bowel accumulation—but at the same time they are apt to bring on troublesome diarrhoea—consequent by they should be withheld as much as possible. Considerable difference of opinion exists in regard to the administration of diuretics. When other means have failed it certainly seems
advisable to have recourse to
them and run the risk if there
be any of accelerating the
process of disorganization.
In some cases of renal dropsey
however every form of diuretic
has been known to fail. This
may be probably owing to ex-
tensive injury done to the tissue
of the glands. When all
other remedies have failed in
carrying off the droprical
effusion then we should have
recourse to acupuncture,
An immense quantity of fluid
may be drawn off in a short
time by means of this simple
expedient and thus give
great relief to the patient for the time and in some cases perhaps it may achieve a cure.

Homer is a frequent and formidable secondary affection. When it is observed coming on in the early stage of the disease it may occasionally be warded off by bloodletting along with the administration of purgatives and diuretics. When it comes on slowly and insidiously in the advanced stage of the disease it very commonly proves fatal. In such cases our chief dependence must be placed upon diuretics but not unfrequently in spite of
our utmost endeavours to the contrary, the result proves unfa
vourable. Dyspepsia, diarrhoea, diseases of the heart, &c., require their appropriate treatment—always bearing in mind however that the system is at the same time labouring under an exhausting and a highly dangerous disease.

March 1854.

[Signature] John M. Kennel.