The Pathology
of the several forms
Of Dropsy

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Chapter I.

Of Dropsy generally.

Few morbid states arise from so many different causes as dropsy. It draws its origin on the one hand from various lesions of numerous important organs, and on the other from various modifications of vital action and of vital processes, as seen, not in lesions of a special organ, but in an abnormal state of the entire system. In the production of serous effusions these causes are found in almost every imaginable variety of combination. Not only do we often find disease of several organs coexisting, each of which may act as a cause of dropsy, but we find still more frequently the coexistence of organic disease with some of those abnormal states of the general system to which I have alluded.

This concurrence of morbid conditions I will keep especially in view in the following essay, as it does not appear to have received sufficient attention; and dropsy has been too much looked upon as a result of mere organic disease, irrespective of the state of the system at large.

The numerous lesions and combinations
of mixed states which produce drupsy, while on the one hand they give complexity to the subject, yet on the other, by showing us this condition in different lights and under various circumstances, they aid us in arriving at its essential causes.

In order to simplify so multiform a subject, and one which is confessedly difficult, it seems advisable to analyse it, and begin with those forms which are most simple or which have but one cause; and having determined the nature and action of that cause, to use it as a key to aid in the solution of the more complex cases. And if we can thus discover several of these simple causes, each of which can by itself when intensely developed, produce hydrophical effusion, we have by the combination of these causes still more powerful aids to assist us in explaining those cases which are inexplicable in the supposition of one of the causes only being in action.

Let us take the simplest and most easily understood example of drupsy as well as that which is most evident as an effect following a cause. We tie the principal vein of a limb in a healthy animal. If that obstruction is sufficient to retard in a great degree the return of blood from the heart, the limb becomes oedematous. If the inferior cava is tied we have not only oedema of the areolar
tissue but effusion into the peritoneum; the extent of the di. corresponding to that of the ob-
stuction. This has been abundantly proved by
experiments, and still more beautifully and
satisfactorily as the result of disease in the
human subject. Lower [De Coda Cap. 2] tied
the inferior cava in a dog and ascites followed.
In another dog he tied the jugular veins and the
head became dry-skeletal. Laennec mentions a
case in which the vena cava was obliterated,
and ascites and of the lower limbs followed.
Sir Ernest Home found that swelling of the
leg sometimes followed ligation of the caphora
vein, which he practised for the cure of varicose
veins. Thus we have dry-sy from a single
cause, venous obstruction, acting in an intense
degree; and this cause in the further examination
of the subject, we will find very frequently in
action either as solely producing, or when
superseded to other causes, aiding in the
production of dry-sy.

On this account we will examine
more minutely the process by which the effusion
takes place. In the above experiment we have
three elements to take into consideration, the
blood, the blood vessels, and the tissues of the
part. The blood is not altered as it need not
be as the effusion occurs in a healthy animal,
and the immediate effect of the experiment
cannot change it in any material degree.
The most marked change occurs in the veins, which, being unable to transmit their contents onwards, while more blood is being constantly forced into them by the action of the heart and the arteries become gorged with blood, and as a matter of course the capillaries become also distended. Thus the pressure exercised on the walls of these vessels is greatly increased while at the same time the blood is kept in relation to the same tissues much longer than usual.

We have not now as was the case formerly, to discuss from what class of vessels exudation takes place or what is the class which absorbs. We know that every tissue of the body, I might say every particle of which these tissues are composed, is endowed with the faculty of imbibition and in virtue of that faculty they either absorb or exude, according to the relation which they bear to surrounding parts. Absorption and exudation are in fact relative terms, the same vital change being in respect to one part of the organism absorption, and to another exudation. We know from experiment that both veins and arteries permit themselves to be permeated, either from without inwards or from within outwards. That this is true in a much greater degree of
the capillaries, the vessels especially adapted for exudation and absorption must be at once evident from the nature of the organic processes.

That the pressure of the blood against the walls of the vessels acts powerfully in causing the transudation of its more watery parts is proved by the experiments of Majendie. When by means of a syringe he threw an injection of water with force into an artery of a dead animal, from all the surfaces to which that vessel was distributed, the injected liquid transuded freely and in quantity proportioned to the degree of force with which the injection was thrown in. It might be objected to this experiment that as it was made on a dead animal the transudation may have occurred from what the old authors would have called relaxation of the exhalent pores. The following is more conclusive. Inject into the veins of a living animal a sufficient quantity of water to double or triple the natural volume of its blood. You will thus produce a very considerable distention of the vascular system, and augment greatly the pressure experienced by the circulating fluid and the pressure imparted by it on the walls of the vessels.
If in this state one of the serous membranes is examined, we will see a serous fluid running rapidly from its surface, and soon filling up its cavity; producing in fact a genuine dropsy before our eyes. In the experiment not only is increased pressure exerted on the walls of the vessels, but the quality of the circulating fluid is much altered by dilution. The influence which this exercise will be considered hereafter.

As a further proof that the pressure kept up by the blood increases exhalation, Majendie cites the following instance. "The cavity of the arachnoid membrane of the spinal cord is often in the living animal filled with serosity. I have several times remarked that in certain moments in which animals make violent efforts, this serosity becomes sensibly augmented."

The third element to be taken into account in respect to the decrease of the despoiled effusion when a ligature is placed on a venous trunk, is the agency of the surrounding tissues. That the tissues are the main agents in withdrawing from the blood the materials suited for their nutrition, there is every reason to believe; and when as in the case in question the blood and tissues are kept in relation to each other much longer than natural, it is probable that the tissues will act on the blood with greater power, and withdraw from it not only their ordinary nutritive
supply but also part of its serous and more readily exuding portion. An osmotic action may aid in this.

The next condition to which I will refer as being sufficient of itself to cause a physical effusion, is alteration in the quality of the fluid. It is true that this fluid cannot be materially altered, or indeed altered at all without the entire system partaking in the change. The alteration of the blood also to which I refer is very often the result of disease, a derangement of the entire function of nutrition. But what I mean is, that certain states of the blood, or if you will, of the system, are sufficient to cause dyspnoe, without any organic lesion of any special organ. I hope also to shew that the effusion results directly from the state of the circulating fluid.

The morbid states of the blood which of themselves are sufficient to cause dyspnoe, are those in which there is a great diminution of its solid and increase of its watery constituents. This includes the anaemic or epanaemic states generally, from whatever cause proceeding.

The faculty of imbibition, and consequently of exhalation, possessed by the tissues is great in proportion to the watery nature of the fluids with which they come in contact. Majendie found that when in the dead body tepid water was
injected into an artery proceeding to a serous membrane, as soon as the current was established from the artery to the vein, a great number of small droops were seen passing out of the membrane. Thus when the fluid contained in the bloodvessels is pure water we find a very rapid exhalation occurring under a pressure which is at most not greater than that to which the blood is subjected in the living body. In a very dilute state of the blood also, it is probable that the water is not attracted by the corpuscles and other solid constituents, with that degree of force which in the healthy state preserves the normal constitution of that highly organized fluid.

I have already mentioned as an instance of increased pressure on the blood causing increased exhalation, the experiment where a large quantity of water is slowly injected into the veins of a living animal. Now it is not the pressure caused by the increase in the contents of the bloodvessels, which alone produces the effusion, as is evident from the fact that it does not ensue when blood, or serum is injected in place of the water. The dilution of the blood is therefore essential. Further, this experiment throws great doubt on the assertion, that mere plethora will
cause dropsey. The injection of blood into the veins of an animal produces a state of purp-

fluence, that is, to say a state of the system in which the quantity of blood is increased, its quality being unaltered, yet dropsey does not ensue. That the blood vessels might be so distended with normal blood as to produce serous effusion, is pretty certain from what we have seen of the results of local venous obstruction and consequent vascular distention; but I have the most serious doubts that such a degree of distension does occur, or can occur, throughout the entire body, which is implied when we speak of dropsey resulting from general plethora.

The serous effusions which follow diseases in which copious venesections, and other evacuating remedies have been employed, are perhaps too familiar to medical men. They are especially liable to occur when a tottering regimen has been enjoined during convalescence. That they arise from the impoverished state of the blood is evident, from the circumstances in which they supervene, from the absence in very many cases, of any organic disease sufficient to cause dropsey, and from their speedy removal as soon as returning health has brought the nutritive functions and consequently the blood, into a normal
The effusions which occur in chlorosis are also to be referred to the cause of which I am now treating. In this disease all the organic functions are inadequately performed, and the blood undergoes the most marked change, the red globules being especially deficient. When the disease proved fatal, we commonly find collections of serum in the large cavities, as well as edema of the areolar tissues; and besides the hypovascularous state of all the structures, there is not necessarily any organic change of any of the organs. The colagula which are found in the veins and in the cavities of the heart are small and of a very light colour.

Another example of dyspical effusion occurring from a vitiated state of the blood, are the dropsies which arise from starvation, or from a prolonged restriction to an insufficient and improper diet. This is best seen among the poor in seasons of famine. Mr. Gaspard [in Journal de Physiologie Experimentelle] has mentioned an instance, where in a district devastated by famine, the people lived upon grass and many of them became dropsical. A more recent and familiar example is that of the famine in Ireland in 1846.
The flood must soon become impoverished under such circumstances, and its qualities so modified, as to facilitate the translation of its aqueous part.

The diarrheal effusions into the serum cavities which were so common in the scouries that formerly proved so destructive, are evidently closely allied to the cases just cited.这里 not from an absolute deficiency of fluid, but from the want of some constituents necessary to the formation of a perfect fluid. This fluid became much altered in its nature and properties. The diminution of its fibrin and consequently of its power of coagulation, was very marked.

With respect to the share which the flood has in producing dropsy, Sydenham says, "This disease in general proceeds originally from the weakness of the blood" and he mentions as causes which weaken the flood, and so favour the recurrence of dropsy, immediate bleeding, diseases of long standing and the destructive custom of drinking spirituous liquors to excess. The most important curative indication, he repeats several times is to strengthen the blood. The great progress of medical anatomy since the time of Sydenham has led us to connect dropsy more with special organic lesions, and in proportion perhaps to neglect the vital
Conditions, which our predecessors having to rely on them more observed better than we do.

I have just met with an account of the sufferings of the crew of the Bona Dea, on the wreck of their vessel, in January and February of the present year. They were suddenly left without a morsel of food, or a drop of fresh water. On the third day they began to suffer much from thirst. The next two days they drank large quantities of salt water. On the sixth day they were stated to be all in a very exhausted state, and their legs and feet began to swell very much. They were rescued on the twelfth day. Many of them died, and a fortnight after it was stated of the survivors, that their feet and legs were still much swollen. Here it is to be observed, that the effusion followed copious draughts of fluid. We could not imagine the occurrence of drying, no matter how much the blood was wasted by starvation, unless fluid was supplied from some source.

Andral in his Clinique Médicale, Tom. III. has related some cases of persons dying desiriperal, who presented no appreciable lesion of their solids; but in whom there was he says "in reality no blood to be found, either in the large vessels, or in the capillaries.
for the term blood, could not with propriety be applied to the reddish watery fluid which the vessels contained. Such cases as these, show the connection between the state of the blood, and the formation of dropsy, in a very forcible light.

A watery state of the blood does not tend to produce dropsy, merely because it is more liable to transude through the vessels, but also by the disordered state of the circulation which such blood produces. The complex circulatory apparatus, is adapted for a fluid of a certain kind, and in a certain quantity; and when the fluid is much altered, in either quantity or quality, the apparatus is thrown into disorder. The heart palpitates, and the arteries jerk.

The blood is unequally distributed. There is flushing and heat of some parts, pallor and coldness of others. Such irregularities of the circulation will manifestly favour dropsical effusions.

Causes which produce debility of particular parts, favour the occurrence of dropsical effusions into them; oedema often occurs in a paralyzed limb while its fellow which is not paralyzed escapes. On February last I saw a boy in the Whitworth Hospital, under the care of Dr. Banks, who had cerebral symptoms
referred to the right side of the head. The left side of the body was paralysed, and the right frequently convulsed. She was greatly emaciated. There was oedema of the left ankle and none of any other part.

Sir Henry Marsh in the Dublin Quarterly Journal Aug. 1853 mentions the case of a man, a convalescent from fever and greatly debilitated. The right side of his body was paralysed, and was a mass of serous effusion, filling on the slightest pressure; while on the left side there was not a trace of effusion. He does not say whether this was in any degree produced by the patient lying on the paralysed side, as it is difficult to understand, how dropsy could otherwise affect exclusively an entire side, when the subcutaneous areolar tissue affords no free communication. I have seen a case in which the effusion was limited to one arm and side, independent of paralysia which admitted of such explanation.

Analogous to these are the cases referred to by the same author, where inorganic disease of the sciatic nerve produced atrophy of the affected limb, followed by oedema. He also mentions a case where
a limb wasted, from chronic disease of the hip joint, and when effusion subsequently occurred in both legs, it was far the greatest in the wasted one, and it remained oedematous when all trace of effusion had disappeared from the other.

In a case of cardiac disease with which I was lately acquainted, there was enormous oedema of the integuments of thescrotum, requiring incisions, slight oedema of the legs, and none anywhere else. The scrotum had been injured, by riding a horse without a saddle. Perhaps we may attribute the preponderance of effusion into particular parts, or into a single serous sac, while the cause of the oedema acts generally, to some debility of the parts although it may not be apparent.

In cases of this kind there are various circumstances which favour the occurrence of oedema. In the former instances the patients were greatly debilitated, and the blood was in consequence in a stateavouring transudation. But this was not of itself sufficient to produce effusion, for it did not occur in the sound limb. The circulation in paralysed parts loses all the aid, which in health it receives from muscular action. The
inhibition of the part too is greatly impaired. The loss, or diminution of nervous influence, produces both these results, but we are in a great measure ignorant of the effect which this loss has on the bloodvessels themselves. However, there can be little doubt that it has an important influence on the circulation through them, and perhaps on their calibre, and if so, consequently on the processes of exhalation and absorption.

The third of the simple causes of oedema which I will mention, is a certain degree of stimulus or irritation of the tissue where the oedema is formed. This cause is neither so simple, nor so self-evident as the two first. Treating as it does of perturbed vascular action, it leads us insensibly from the subject of oedema, to that of inflammation. It is very doubtful whether any distinct line of demarcation can be drawn between them; or indeed any line, which is not dependant on the particular views that the person drawing it, holds of these forms of morbid action.

That a degree of vascular action, less intense than that which causes exudation of lymph, and the formation of pus, will produce effusion of serum is matter of daily observation. The oedema
of an empyema, or not; and the puffy
swelling surrounding a common boil,
one example of it. Such effusions I do
not include under the present head, or
consider as examples of drupae at all.
Neither will I consider as drupae, any
effusion which is accompanied by the
formation of pus, or in which coagulable
lymph is extensively exuded. Such cases
are evidently inflammatory, and the
collections of fluid so formed, while
they may produce many of the phenomena
of drupical accumulations, are altogether
different, both in their mode of production
and manner of treatment. We cannot
exclude from the class of drupae, all
those collections of fluid in which coagulable
lymph is present, as lymph may be un-
doubtedly deposited from a fluid essen-
tially drupical; but in such cases it is
rare to a great extent.

The accumulations of fluid resulting
from the tubercular process, or from the
irritation of tubercles, if considered as drupae
at all, come under this third class. It may
be said that the action in question is
inflammatory, and there is little doubt
that in many cases it is so. In other cases
however, the action seems to fall far short
of this; and the effusion may be considered
as a result of the stimulus or irritation, produced by the presence of tubercles. The nature of the fluid in such cases, is also often altogether different from inflammatory effusion. I will therefore in another place, cursorily at least, the pathology of those examples of second effusion, produced by tubercular disease, which are commonly spoken of as dropsies.

The fluid being the source of the exhalation, which moistens the tissues; it is but natural to expect, that an increased supply of blood to a part should cause augmented exhalation. We find that the cutaneous transfusion is increased, by any cause, which augments the quantity of blood circulating at the surface of the body, such as heat, exercise, and friction. In the manner when friction is applied continuously to a part, it first becomes red from the increased afflux of blood; and then serum is effused beneath the cuticle, forming a blister; and this without any true inflammatory product. There can be no doubt, that a like determination to an internal surface, will occasion a similar increase of exhalation. In attributing effusion to this cause, it is
not necessary that increased vascularity be detected after death, as the vascular exsanguination, and the injection of the capillaries which produced it, may be dissipated soon after the effusion has occurred, and no evidence remain of the vascular action but the unabsorbed fluid.

The converse of this may occur, as in dropsy the result of organic disease in which the excreting functions are impeded; so that effuse and irritating matters, being separated along with the effused fluids, may act injuriously on the surface, or tissue, with which they are in contact, and in this way may be produced the evidences of irritation or of structural change, observed either in the course of the disease or after death.

The cases of dropsy attributed to increased vascular action in the past where the effusion occurs, are now much less numerous than formerly, as the advance of pathology makes us acquainted with causes of dropsy, of which we were previously ignorant, and we find that in many cases, the constitutional symptoms from which the names phlegmic, active, acute, and inflammatory have been applied to dropsies, may be referred
to disease of a particular organ.

I have now considered three proximate or simple causes of dropsy, that is, various obstruction, a diminution of the solid, and increase of the watery constituents of the blood, and increasedvascular action in the part where the dropsy forms. I think these will include all varieties of dropsy. Though each of the three is singly sufficient to produce dropsy, yet in most cases we will find more than one of them in operation; and we will see numerous instances, of one of the causes being in action in a greater or less degree, for a lengthened period without dropsy ensuing; yet as soon as another of the causes was added, effusion followed. These proximate causes have been spoken of briefly, as I will have constant occasion to revert to them, in examining the special lesions which produce dropsy.
Chapter II.

Of cardiac dropsy.

In proceeding to consider the various forms of organic disease which produce dropsy, the heart first claims attention. We have seen the great influence which venous obstruction exercises, in causing dropsy; and we can therefore not be surprised to find, that when such obstruction exists in the central organ of the circulation, these effects should be most frequent and most marked. Various forms of cardiac disease produce dropsy, but they may all be reduced to the simple formula, if obstruction to the circulation, whether that be caused by the several forms of vascular disease; by contraction or dilatation of the various orifices, cavities, by hypertrophy or attenuation of its walls, or by degeneration of its structure. The obstruction is most obvious and immediate when situated at the termination of the venous system, in the right side of the heart. If the impedance is in the left side of the heart, it is propagated backwards in the course of
the circulation. The lungs become gorged, the right cavities unable to transmit their contents forward, cannot receive the blood returned by the veins. Thus in its turn the entire venous system becomes distended with blood, and description effusions ensue. But disease of the heart does not produce dyspnoe in all cases. We often see similar cases of disease, prevailing to the same extent and showing evidences of an equal degree of obstruction to the circulation, and yet dyspnoe occurs in one case and not in another. Nay we will even see a case in which the disease is but of moderate extent, and the signs of obstruction slight, and yet serous effusion occurs to a very great degree; while in another case the same form of disease is developed to a great extent with most marked signs of obstruction and yet description effusion occurs only to a very slight degree or not at all. Now in the cases in which dyspnoe does occur, it is evident that some other cause, or causes, are in operation, the influence of which, when added to the venous obstruction produce dyspnoe, when the latter alone was not sufficient.

In all cases of dyspnoe we must consider the conditions of vital action,
True, a pretty account of it is— but must account of
Blake's researches on the reason why narcotics affect the
producing reflex.
as well as the nature and extent of structural change. The former indeed is often more important than the latter; and I believe that by keeping the modifications of vital action constantly in view, and by considering them as acting on, and as being acted upon by structural change; we will have a key to the solution, not only of the ordinary, but of most of the anomalous cases of dyspnoea. Let us now see how these conditions of vital action, or the vital processes, are modified in cardiac disease.

Diseases of the heart do not usually at least produce dyspnoea at once. As a class, they are chronic diseases, especially those with which we have to do. The lesion begins and progresses gradually, and for a long time there is neither such an amount of structural change as to impede the circulation in a notable degree, nor are the vital processes much deranged. But by degrees the structural change becomes greater, and with it evidences of increasing disorder of the circulation. The respiration is impeded, and in proportion to that impediment, the aeration of the blood is more or less interfered with, and it retains more or less of the venous character. The obstruction to the return of
Blood to the heart acts also on the liver; it becomes gorged with blood, often to such an extent that, even in a brief space of time, its size is wonderfully increased. In consequence, its function is impaired, the elimination of bile being hindered by the congestion of the organ. The circulation of this bilious and badly aerated blood produces injurious effects on other organs and functions. The organic functions are so connected, and mutually dependent on each other, that derangement of one organ or function affects all the rest. Thus cardiac disease in its various forms makes itself felt in the vascular system, and through that system in every organ, and in the function of every organ; and so it gradually throws the entire animal machine into disorder. The nutritive process is interfered with, both by disorder of the respiratory and biliary functions, which are so closely connected with, or rather are integral parts of that process; and by the restrictions to which the patient is subject on account of his disease.

In this manner the constitution of the patient is gradually broken down, it may be the work of many years, and of repeated violent exacerbations; but at length they are accompanied by more or less cedema,
subsiding perhaps, on the subsidence of the attack, if he at that time recovers. At length, however, the obstruction to the circulation still increasing, and the general health being proportionally disordered, he becomes universally diarrheal and dies.

Now in such a case, and it is the ordinary history of cardiac dropsy, we cannot say that the effusion is solely the result of the organic lesion of the heart. It is just as evidently, and as much, dependent on the state of the circulating fluid, produced by the long continued derangement of important functions. But why do other and similar cases of cardiac disease not produce these derangements. The results of a disease are dependent on the constitution affected by it and the circumstances in which the individual is placed, and so we find that in many cases of heart disease, the nutritive functions are not interrupted, the blood is not deteriorated, there may be even well marked plethora. Consequently dropsy does not, in need not occur, and the patient may be and often is cut off in some other way before the system has been brought into a sufficient state of disorder, to favour the occurrence of dropsy.
On this subject Dr. Latham says: "Now this I have observed. Where the unsoundness of the heart is the same in kind, dropsy will show itself at different periods of its progress in different cases; earlier in one man and later in another. I do not pretend to explain the universal reason of such diversity, but I think I see a reason for it, which will hold good to a large extent. In those who are well off in the world, dropsy seldom arrives until the unsoundness of the heart has reached the point at which the circulation can endure its oppression no longer without seeking relief by effusion of serum. But in those who are ill off, dropsy often appears long before the unsoundness has reached the point at which it would naturally and necessarily take place." Lectures vol. II. p. 351.

He attributes the difference, principally to the lower classes being compelled to use exertion, but the want of a sufficiently nutritive diet no doubt impoverishes the blood and so favours effusion.

But in investigating the pathology of cardiac dropsy, we must take into consideration, not only the structural change of the heart and the molibd state of the blood, but we must also bear in mind that other lesions frequently coexist, which may
have an important influence in causing the effusion. Dr. Latham says 'If I except those cases in which the damage done to the heart could be clearly traced back to some distinct attack of hereditary disease, such as rheumatic inflammation: my records of dissections do not supply me with a single instance, of a person reputed to die of disorganized heart, or its consequences, in whom after death other parts also were not found disorganized, such as the liver, the kidneys, serous and mucous membranes and above all, and more frequently than all the rest, the whole arterial system. And the kind of disease in other parts has been such as could in no wise have been derived from the heart, but it must have grown out of special morbid processes within themselves, whether prior, or subsequent, or simultaneous with the disease of the heart. When therefore there is dyspnoe, and with it an unsound heart, you must not be too sure that the heart has been altogether instrumental in producing it. The heart may have only had its share, and its share may have been a small one.' Lectures vol. II, p. 307.

Some authors have considered the dyspnoe as a mere mechanical result, and its amount as corresponding to the degree of the mechanical hindrance, presented to
the circulation. I hope I have shown that this mode of reasoning will not do; and that we must often at least admit the cooperation of other and powerful causes. We must view the mechanical cause as working through a vital agency. These considerations make it much less easy to identify dropsy with particular forms of cardiovascular disease, than if the dropsy was solely the result of such disease. Still we may try to discover those states which, other things being equal, are most favourable to its occurrence.

Dr. Latham justly remarks, that "Practically, and with reference to their secondary diseases, all forms of unsoundness in the heart may be reduced, either to that which augments, or that which diminishes, its organic power. Practically, they are all either an hypertrophy or a dilatation. They make the heart either over strong or over weak."

When we consider that the action of the heart in causing dropsy, is by producing obstruction to the circulation, it will be at once evident, that those lesions in which the power of the organ is lessened, will tend to produce dropsy more than those in which it is increased, inasmuch as a decrease in the power of the heart, will cause greater obstruction of the circulation than an increase of it. Consequently, hypertrophy
will be a less powerful agent in causing
destroy than dilatation. Pure hypertrophy
may tend to produce destroy, by increasing
the force of the arterial circulation and so
producing engorgement of the capillaries.
But it can only do so when great in degree;
destroy from pure hypertrophy, if it ever
arises from it, is very rare.

In this case there is only one cause in action, so far as
the heart is concerned, to produce the
capillary congestion, that is the force of the
arterial circulation. When however an obstacle exists
to the return of venous blood to the heart, there
are two causes tending to produce the
engorgement of the capillaries. There is
the direct pressure exerted by the heart, in
continually forcing the blood onwards; and
there is the backward pressure of the retained
venous blood. In such cases therefore it is
easy to see why destroy should occur early and
to a great extent, as well as the reason why
it is more difficult to remove.

Dilatation of the heart existing by
itself acts as an obstructive disease, inasmuch
as the power of the organ is lessened, and
it produces all the phenomena of an
obstructed circulation, destroy among the
rest. When the organ is flabby or softened as
well as dilated, the obstruction and its results
are more marked.

Another and a very important reason besides the mere want of power, why dilatation should tend so much to produce dropsy, is that the dilatation itself often arises in and is excited by weak and cachectic states of the system, in which the blood is already in an unhealthy state and so favourable to the production of serous effusion, as soon as the circulation is obstructed.

The effects of dilatation of the right and left ventricle are different. When the left is principally affected, the whole systemic circulation is languid, from the impaired propelling power of the organ, there is coldness of the extremities and other phenomena, arising from a slow circulation and eventually oedema. Whereas when the right is dilated the phenomena are those of impeded venous circulation. When this form of dilatation is considerable, the blood regurgitates through the tricuspid orifice, and the venous obstruction thus caused, if long continued leads to dropsical effusion.

In the left side of the heart diseases of both the mitral and aortic valves are frequently associated with dropsy. The mitral, being in the backward course of the circulation nearest to the venous system, disease of it, whether obstructive or regurgitant, acts
Disease of the aortic valves, whether obstructive or regurgitant, produces dyspnoea by preventing the left ventricle from effectually unloading itself; and when it cannot do unload itself, the circulation is as much obstructed, as if the disease was situated in the mitral valve, or right side. Dr. Williams states, that he has seen dyspnoeal effusions quite as frequently in severe aortic, as in mitral disease.

However, just as we found, that in most cases, dyspnoea could not be attributed to structural change of the heart alone and independent of other causes, and that it was the complication to which the result should be attributed, so, when we come to examine the changes in the heart itself, we find that its different forms of disease cannot be
Pursued far as distinct states, or separate and distinct causes of secondary diseases. Nature does not present them so to us, and we must beware of being led to forsake her path by a priori reasoning.

We find then that lesions of the heart are generally complicated. As we saw that derangement of one organ of the body led almost of necessity to derangement of other organs; so the heart being composed of various parts closely allied in function, the integrity of one part is dependent on the integrity of the others, and disease of one part leads very often to disease of other parts. In most cases it is this complex unsoundness which we have to consider, in examining into the mode of action by which structural change of the organ produces or assists in producing dropsy and other secondary diseases. It is not the effect of a mere dilatation or hypertrophy which we have to take into account, but the distinction also, and the regurgitation which so often give rise to these states. So again it is not merely a constricted or a dilated orifice; but we have to consider in connection with these states, the dilatation and hypertrophy to which they so often give origin.

So important is this sequence, that Dr. Hope says that according to his observation, so long as the valvular disease remained...
uncomplicated with dilatation hypertrophy, or softening; it is not in general productive of great inconvenience. We might add to this, the consideration, that by the time these secondary lesions have become established, the system has been so far deranged, by the disease that the blood is in a state favourable to dyspneal effusion. The dilatation in fact may be regarded as the measure and result of this state of weakness; and the hypertrophy may be looked on as that of the degree of obstruction.

Now when all these conditions are conjoined in the production of dyspny, it is no wonder that its first appearance in disease of the heart, is looked for with anxiety, and its occurrence regarded in so serious a light. It marks the eventful period, when a new law is beginning to take effect in the circulation, and to obtain mastery over the law of health. The oedema may be but slight and unimportant in itself, like the scattered drops of rain, which precede and announce a thunderstorm; but it marks the first yielding of the bloodvessels to a vital necessity, which they can no longer resist. It is the exponent, not so much of the organ, as of the effect which it has produced on all the functions of the body. In the words of Dr. Latham. The first
appearance of dropsy in distant parts, declares the heart fatally damaged, as the center of all life and of all function throughout the body. So such a dropsy wholly a morbid process, or is it one of those efforts at repair which we see constantly going hand in hand with disease. What is the state of matters with which nature has here to deal? An undue amount of watery fluid exists in the blood, and interferes so much with the vital processes, that it must be got rid of at all hazards, or these processes cease. Nature attempts the removal of this fluid. If she does it by a free surface, such as the kidneys, bowels, or skin, it passes away from the body and dropsy does not result. If these channels are not available, it being impossible that the fluid can remain in the blood vessels, it is poured out into the serous membranes and cellular tissue. The separation of the excess of serum from the blood, is a salutary process intended by nature for her own relief. The necessity of the case requires it and the relief is obtained in a greater or less degree. It is the accidental circumstances of the surface by which the fluid is got rid of that renders the process injurious; for if the cellular tissue and serous cavities had direct outlets, dropsy would not ensue.
Now, this 'the two needles' is a most perplexing and ingenious jest - this is carrying the matter too far. Such effrontery is often a very great evil.
Cardiac dropsy generally commences by oedema of the ankles, and for two reasons. First, because in the upright position they are the most dependent portions of the body, and the fluid in whatever part of the subcutaneous acellular tissue it may have been effused, gravitates to, and accumulates in, the lax tissue about the ankles. Second, because in the lower extremities the circulation of the blood is most languid, both on account of their distance from the centre of the circulation and because the return of the venous blood is opposed by its gravity. We have already seen how influential such a retardation is, in producing dropsy. When the patient is walking about, this oedema is most evident at night for obvious reasons.

Physiologic effusions connected with diseased heart appear sometimes to form very rapidly. About a year since, I examined the body of a man in the Cowgate, who died rather suddenly. He was a shoemaker between 40 and 50 years of age, and of interminable habits. He was in his usual health on the morning of the day on which he died and went to work as usual with his employer. While there, he was seized with a severe pain in the chest, upon which
he returned home and a surgeon was applied. He died in a very few hours. The case was taken up by the authorities but was not followed, as there was no reason to suppose that his life had been tampered with. Subsequently I opened the body at the request of some of his friends. No medical man had seen him during his illness and I could not obtain a more accurate account of the symptoms. The examination was made 48 hours after death. The body was in a cold room and exhibited evident signs of decomposition. It was that of a large robust man.

The pericardium contained several ounces of reddish serum. The heart was much enlarged, pale and very easily torn. Both ventricles were much dilated. Their walls were of about normal thickness.

Both pleurae contained fluid, in one to the amount of two pints, in the other rather more than one pint. This fluid was a reddish serum without a trace of any inflammatory product. The lungs presented nothing remarkable.

The peritoneum contained a few ounces of serum similar to that in the pleurae. The liver, spleen, kidneys, and intestines, were gorged with fluid, but did not present any other change.
This effusion, must I think have occurred during the short period of his illness. Dr. Blackhall, in the appendix to his work on dropsy, mentions a case of angina pectoris, while the patient was walked in the night by a severe paroxysm, which continued for some hours when he expired. Each pleura contained about a pint of pale serum. In another case of sudden death from angina, two quarts of serum were found in the pleurae. Dr. Latham gives an account of a case of angina, the first paroxysm of which came on while the patient was in his usual health, and proved fatal in two hours and a half. Eight ounces of serum was found in each pleura.

It has appeared to me that the effusion in these cases, may be referred to the deficient action of the heart, which produces the almost pulseless state, and the sensation of sinking, often so marked in angina pectoris. In the case I have described, it was not known how the heart had acted during his illness, but from the manner in which all the abdominal visera were gorged with blood, taken in connection with the dilated and softened state of the heart, there can be little doubt that it was acting very feebly. This
appears much more rational, than to suppose that the hydrothorax arose spontaneously, and was the cause of the symptoms. Deficient action of the heart will of course bring the blood into a state approaching more or less to stasis, which as we have seen is very favourable to transudation.

Disease of the lung tends to produce dropsy by obstruction of the circulation. Their action is thus similar to that of the heart, and I believe cannot be separated from it. Obstructive disease of either the heart or lungs must affect both the one and the other. I will not therefore consider pulmonary disease as a distinct cause of dropsy. The effusions which sometimes occur in the last stage of phthisis, arise from debility rather than disease of the lungs. Besides renal disease is very often associated with phthisis. In any disease, prolonged dyspnoea, preceding dissolution may produce dropsical effusion, where the blood is previously in an impoverished state, which of course if very often is in such circumstances. Thus I have lately seen very considerable effusion into the serous cavities, where the only lesion of any note was an erosion of the cætra, which produced laryngeal dyspnoea.
Whether the dyspnoea be a consequence of obstructed circulation or its cause, it is the obstruction which produces the tendency to serious effusion.
Having now discussed the pathology of cardiac dropsy, which I did first, partly on account of its frequency, and partly because I thought it would assist us, in the further investigation of the subject, I will proceed to consider a very important class of dropsies, namely those which depend on renal disease.

This class differs in very many points from that last considered. The identification of dropsy with disease of the kidney is still of a very recent date, and the subject, though earnestly and incessantly cultivated, cannot yet be said to be free from difficulty. Much more attention has been hitherto paid to the lesions themselves, and to their secondary results, considered separately, than to the manner in which these results are produced. The organ is a very complex one, and its complexity is of a very minute kind. In the heart we measure by fingers breadth; in the kidney by the thousands of an inch. The function of the heart, and of its few simple parts,
is clear to a demonstration, and the alterations of these parts, and the effects which follow these alterations are clear in a proportional degree. On the contrary, though we know the function of the kidney as a whole, yet the offices of the several parts, which make up each of the multitude of little systems comprised in a single kidney, are in a great measure still matters of theory. The physiology of disease is more obscure than the physiology of health. If we do not fully understand the function of an organ, still less can we fully comprehend the derangements of that function.

The function of the kidney is so closely connected with the withdrawal of superfluous water from the system, that we can readily understand how a total or partial interruption of their function will cause an accumulation of this water in the bloodvessels, unless it is carried off by some of the other secreting surfaces which in common with it separate water from the blood.

I have already considered the manner in which an actual or relatively watery state of the blood produces or favours the production of dropsy. By a relatively watery state, I mean those cases in which, although a sufficient quantity
Of normal blood exists in the blood vessels, yet it is so diluted that in relation to its whole bulk it is watery. Such a state in fact as Majendie induced by injecting water into the veins of a healthy animal. I have now then, to consider those alterations of the renal organs which produce such states of the blood. I will begin with those lesions, which, both in time and degree, are least removed from a state of health.

The discovery of the very frequent and intimate connection between diseases of the kidney and general dropsy, threw a great deal of uncertainty on our previous knowledge of the subject. It is evident that any investigations which were made into the connection between organic disease and dropsy, while those lesions which are connected most frequently with general dropsy were unknown, must be received with great reservation. From the date of Dr. Bright's discovery, dropsy required to be investigated anew! Many of the observations made even since that date must be received with caution; as there was not for a long time, nor is there perhaps yet, a very general or accurate acquaintance with the lesions in question.

The form of dropsy to which the names acute, inflammatory, or athermic,
is applied, and which was so long regarded as perhaps the greatest stumbling block in the pathology of dropsy; is now closely if not quite inseparably connected with renal disease. The terms are used to express dropsy occurring rapidly, and with the symptoms of feverish reaction. The quick and hard pulse, the hot and dry skin, the headache and thirst, were considered as indicating the existence of inflammation and when these symptoms were rapidly followed by the effusion of serum into the areolar tissue, of perhaps the entire body, the effusion was regarded as the result of inflammation of that tissue, and these opinions are perhaps not yet altogether exploded.

These cases were also and often required antiphlogistic treatment and the blood was frequently found buffed. The two prominent features, the inflammatory symptoms and the effusion were connected together as being directly cause and effect. I hope to show that the febrile symptoms do not arise from inflammation of the tissue where the fluid is poured out, and that, though perhaps mainly owing to inflammation, they may be partly attributed to another cause.
The simplest, as well as perhaps the most common case of acute dyspnoea, is that in which it follows exposure to cold; and it is especially liable to follow it, when combined with fatigue or wet, which are well known to increase the action of cold. Now the immediate effect of cold is to repel the blood from the surface of the body, causing of course a great increase in the quantity circulating in internal organs. This is the first step in a variety of mortel processes; and why one disease should supervene in one case, and another in another case, we can only account for by vaguely attributing it to predisposition or idiosyncrasy.

The kidney with which we have now to do, possesses a structure more likely to be injuriously affected by this increase of the quantity of blood circulating in it than any other organ in the body. This arises from the nature of its circulation. It is very largely supplied with blood, and this blood has to pass through two distinct sets of capillaries, which occurs in no other single organ. This structure renders its circulation peculiarly liable to derangements.

Cold besides producing congestion of internal organs, has another important effect. It checks the cutaneous exhalation,
and in consequence, the large quantity of water and the various other matters, which in health are constantly passing off by the skin, are retained in the blood.

The amount of the cutaneous exhalation is closely connected with the occurrence of dropsy, as well as frequently with its removal; and it is very probably its diminution, or interruption, which renders dropsy so much more frequent, in cold and moist than in warm climates, rather than a difference in organic diseases. When we reflect, that the average insensible transpiration from the skin, amounts to upwards of two pounds in 24 hours, it will be evident that the retention of the greater part of this in the blood vessels, will exercise an important influence on the blood, and on the various functions of the body, even so far as the mere water is concerned.

The skin and kidneys are the great emunctories of superfluous water, and so far are closely allied in function, and in respect to the excretion of water, they exercise reciprocal functions. Those circumstances, such as heat and exercise, which bring the blood to the surface of the body, and render increased exhalation from the skin necessary, diminish the quantity of water secreted by the kidneys. On the
other hand, the circumstances which repel the blood from the surface, and lessen the cutaneous exhalation, increase the quantity of water excreted by the kidneys. Every one is familiar with the fact, that a greater quantity of urine is passed, in cold than in warm weather.

This is the state of matters in health. To some extent also, the same process goes on in disease. When one of these organs is unable to perform its function, if the other is healthy, it will fulfill its office as far as comes within its province.

Besides the large quantity of water which is constantly passing off from the cutaneous surface, the skin excretes various other matters, our knowledge of which is still very indefinite. Among these is an acid—
the acetic or lactic, and perhaps also the butyric. Also various salts, among which the most constant are, the chlorides of sodium and potassium. Carbonic Acid is also given off by the skin. But perhaps the most important of the solids, in relation to our present inquiry, which is thrown off by this surface, is an organic compound constituting from 3 to 6 parts in 1000 of the perspiration. Our knowledge of this substance is not very accurate, but it appears to be a protein compound, and one of the products
of the disintegration of the tissues. It is very probable that the processes a most important part in the elimination of these effects matters from the system than is generally supposed; the nature of the secretion rendering accurate investigation very difficult.

Whether it is from this effect modified compound, or from some of the other matters enumerated; or from some still unknown constituent of the cutaneous secretions; one thing is certain, that the obstruction of these secretions is followed by the most disastrous consequences.

This is shown in a very striking light by the experiments of M. M. Becquerel and Besset, Comptes Rendus Oct. 1841. They shaved the fur from a rabbit, and then covered its body with a impermeable varnish. By the time this varnish had dried, the temperature of the animal's body was reduced to 75° and in an hour make it died. These experiments have been repeated and confirmed by Majendie and others. The arterialization of the blood was found to be much interfered with.

These results can only be accounted for by the retention and accumulation in the system of matters which should have been thrown off as soon as formed,
and by the injurious influence which these matters, when so retained and accumulated, exercise on the vital functions.

Now when life is so rapidly destroyed by the complete obstruction of the excretions from the skin, it is but reasonable to infer, that a less degree of obstruction will produce injurious effects proportionate to the amount of obstruction.

We have already seen the influence which cold has, in lessening the cutaneous transpiration, and there is every probability that the decrease affects all its constituents.

We are now in a position to understand better, the phenomena of acute dyspnoea. A labourer, while perspiring and fatigued at his work, sits down to rest on the cold ground, or on a stone, or while in this state he drinks a quantity of cold fluid: A seaman drenched to the skin is exposed on the wreck of his vessel, or a drunk man lies all night under a hedge; all are familiar examples. The immediate effects in all are the same. The cold acts powerfully, the blood is driven from the skin and its secretions are arrested. In consequence the blood accumulates in internal organs while it is altered in constitution, by the retention
in it of the water and other materials ordinarily thrown off by the skin. All these circumstances act unfavourably on the kidney. We have seen that its structure is very favourable to congestion. The refection of the superfluous water is thrown on it, but the most important influence is probably exercised by those other matters which being prevented escaping by the skin, are in default, thrown on this, in some respects vicarious organ.

A congested state of any organ, is unfavourable to the exercise of its function. The secretion of glands is lessened by such a state. Congestion of the liver, interferes with the secretion of bile, giving a bilius tinge to the complexion. The constitution of the blood has also an important influence on the circulation in an organ. The attraction exercised by the tissues, on those portions of the blood fitted for their nutrition modifies the circulation through these tissues. So the attraction of glandular organs for their secretions, modifies the circulation through them; an increase in the materials of these secretions, producing an increased attraction and consequently a slower circulation. Thus the circulation in the pulmonary capillaries is arrested, when the proper secretion of these organs;
carbonic acid, accumulates to a certain amount in the blood. The circulation through an organ of materials foreign to it exercises an important, and often a still more powerful influence on its functions. The presence of alcohol in the blood as is well known, hindered to some extent the evaporation of carbonic acid from the lungs. Whether from the congestion of the kidneys, or from the circulation through them of the deleterious materials which are prevented passing off by the skin, or from the stress thrown on them by the increased quantity of water which they are called on to excrete, or from all these causes combined, derangement of their function, is the first result in the cases of dropsy now under consideration. The secretion of urine is much diminished, or it may be altogether suppressed. It is always highly albuminous, and generally contains blood, which, coming from the rupture of some of the vessels, is an unmistakeable evidence of their distention. Whether it arises from primary congestion or obstruction to the circulation through them. The specific gravity of the urine may be natural; or if the quantity be very small, it may be much increased. I have seen it 1.043.
There is usually chilliness or rigors at the commencement of the attack, which may be accounted for by the refusion of blood from the surface. A state of fever soon succeeds, and this I believe is mainly attributable to inflammatory action going on in the kidneys; though I also think it is partly owing to another cause.

When Prevot and Damagremon removed both kidneys from an animal, peculiar effects were produced. About the third day diarrhoea and vomiting set in; there was fever, the temperature in some cases rising to 110°, in others it was lowered to 92°. The pulse became exceedingly quick and death ensued between the fifth and ninth day. In Mayers experiments these results followed much sooner, death occurring in from 10 to 30 hours after extirpation of the kidneys. In all the cases the blood was found more watery than natural, and it contained a large quantity of urea. In these cases the fever was evidently produced by the urea circulating through the body. Mr. M. Bernard and Barresowit have indeed attributed the symptoms following extirpation of the kidneys, to the formation of carbonate of ammonia; and Freiricks has attributed
the so-called uraemic poisoning to a like cause, but their observations have not been generally confirmed. At all events it does not affect the argument. In the cases of dropsy now under consideration, we have seen that the urine is scanty. The amount of urea excreted is very much lessened, and in consequence it accumulates in the blood. When we recollect that, on an average nearly 300 grains are excreted in 24 hours, we must see that it will not require a long time to produce an accumulation sufficient to cause great disturbance of the system. It may be said that in chronic renal disease, the excretion of urea is often less than in the cases in question, and yet febrile symptoms are not produced. But there is obviously a great difference between the rapid accumulation of a noxious principle in the system, and the occurrence of the same accumulation slowly, while the system is being gradually accustomed to its presence. We don't expect to find results so violent as those which follow extirpation of the kidneys. But if the effects of cold and the other steps in the process which I have specified, produce a state of blood similar in kind to that resulting from this experiment, we are warranted in
concluding that symptoms similar in kind, though perhaps different in degree, will ensue. 
Consider this question of the cause of the feverish symptoms in acute dropsy, one of great importance in the pathology of the disease.
This state of things being produced, what is the proximate cause of the dropsy? The elimination of water from the skin has been checked, and this evil instead of being remedied by increased action of the kidneys, which are the safety values of the system in respect to the excretion of water, and the organs by which the pressure within the vessels is regulated, and kept pretty uniform, is greatly aggravated by their diminished action. Instead of four or five pounds of water being given off daily by their joint action, the quantity is reduced to one or two pounds or even less. The pulmonary, is the only other surface which in health throws off a considerable quantity of water, and I am not aware that any observations have been made as to the increase or diminution of this exhalation in dropsy. From its nature, and its uniformity in health, it is probably not much altered.

Thus a large quantity of water accumulates in the blood, from deficiency of the normal excretions; and this accumulation is often increased by the attack following large draughts of cold liquids, or a delirium, or by the fluids taken to abate the feverish thirst. The blood is diluted more or less rapidly, as the case
may be, and the vessels become distended, and this process goes on until the blood reaches such a state of dilution, and is subjected to that degree of pressure, that the vessels can no longer contain it. Its thinner parts transude, and dropAy is the result. The increased action of the heart by augmenting the pressure, will aid in producing effusion; and the altered relations and modified affinities, between the blood and tissues, caused by the morbid state of the former, probably contribute their share, to this result. We must take into account the vital agencies as well as the mechanical.

We have also to bear in mind, that the urine excreted in these circumstances is highly evacuable, and that this rapidly and invariably produces a great diminution in the density of the serum of the blood, arising from the loss of its albumen and salts. Dr. Chisholm has shown that this diminution is greatest in the acute forms of renal disease, and it also occurs when febrile reaction arises in the course of chronic disease of the kidneys, being in fact proportional to the amount of albumen in the urine. Now these are just the cases in which dropy occurs most rapidly, and
proceeds to the greatest degree. The connection between the two phenomena is equally obvious and striking.

The dysy is only its appearance at different intervals from the commencement of the attack, according to the severity of the symptoms, and the degree and duration of the suppression of the cutaneous and renal excretions. It is usually an early symptom, and is commonly observed first in the face, from the alteration of the countenance which is produced by even slight infiltration. The effusion extends with more or less rapidity throughout the areolar tissue of the entire body. There is generally considerable effusion into the peritoneum, and frequently into some of the other serous cavities.

The presence of much urea in the blood, seems to exercise a powerful influence on its constitution. The change is most obvious in respect to its colouring matter. The pallor of the face, which is so characteristic in chronic renal disease, often appears in the acute form at a very early period, and it is frequently this in connection with slight oedema, that first draws attention to the disease.

Casts of the prininiferous tubes are generally found in the urine, in greater
or less abundance. As has been stated, blood is generally effused in the acute cases. Here is every reason to believe that it is derived from rupture of some of the Malpighian capillaries, and it passes thence directly into the tubes. It is frequently found in these tubes after death, producing a characteristic appearance. If the blood is effused copiously and rapidly, most of it passes out of the kidney in a fluid state and coagulates without any definite form. Part coagulates in the tubes and subsequently passes or is washed out of them by the urine, and is found in it on microscopic examination in the form of elongated bodies, having diameters equal to the free canal of the convoluted tubes. The fibrin appears as a molecular mass, and it is thickly studded with blood globules.

But the greater number of the casts present a different appearance. They are composed of molecular or granular matter, similar to coagulated fibrin or recently exuded lymph; and are no doubt identical with it. So far they resemble the casts just described, but there are few or no blood globules imbedded in them, while numerous epithelial cells adhere to them. Now I think
that the absence of blood corpuscles in proportion to the fibrin, shows that the fibrin has some other source than mere haemorrhage, that in fact it arises from exudation, and is an evidence of inflammation existing in the organ where it is expelled. The renal epithelium, which is not found in healthy urine, is seen both entangled in these casts and floating free. These secreting cells which in the normal condition do not separate in an entire state from the convoluted tubes, but merely break down and set free their contents, yet in disease are thrown off in a more or less perfect state, which would seem to result from their containing some morbid matter, or from a change in the basement membrane, or in the blood vessels from which they are nourished.

This designation of the epithelium, is not invariably in acute renal disease. There are a few cases which agree in every other particular, the mode of attack, the scanty albuminious urine, the fever and the diphsy with the form just described, but there is a total or an almost total absence of casts or epithelium. I saw a case of this kind in the Royal Infirmary during the last Session. A man named Cunningham aged 45, a groom
and gardener, was admitted on the 15th Dec. 1852. Five or six weeks previously oedema commenced in the legs. He had then slight pain in the lumbar region on motion. Two or three weeks after he had been enfeebled in this region. On admission he was universally anaemicous to a very great degree. Only 10 oz. of urine was passed in 24 hours. It had a specific gravity of 10.4% and was nearly solid with albumen. Hardly any casts could be found in it. On the 20th 20 oz. of urine was passed. On 21st cerebral symptoms set in. On the 22nd there were gangrenous bullae on the legs and he was quite delirious, and he died on the 23rd in a state of profound coma. A full examination of the body could not be obtained, but on the most minute scrutinising of the kidneys nothing essentially morbid could be discovered. A question was indeed raised as to their authenticity as they were surreptitiously obtained; but I had every reason to believe they were genuine. Dr. Johnson relates two similar cases so we cannot doubt that the functions of the kidneys may be seriously deranged so as even to cause death, without their presenting any material alteration of structure. In the case of Cunningham, no important symptom could be detected except those evidently connected with the renal affection.
and in the case of Ager related by Johnson all the other organs were healthy. In both the urine was very watery and highly albuminous, therefore the kidneys must have been in fault. Something in them or in the blood acting on them, must have interfered with the secretion of urine, and that secretion being interfered with, the dropy followed almost as a necessary consequence.

The dropy, as effusion takes place, or is perceived first in the face, in the lower parts of the eyelids, or about the ankles according as the patient is confined to bed or is walking about. It gradually or rapidly extends up the legs and throughout the areolar tissue of the entire body. There is more or less ascites but this is not a prominent feature of the effusion unless there is disease of some of the other abdominal organs, or that inflammatory action has been set up in the peritoneum, from the irritation produced by the urea contained in the fluid first effused. Effusion into the pleural cavities is much less common than ascites, as is also pericardial effusion. In some cases there is copious hydrothorax, and but trifling ascites, and so in all forms of general dropy we often find a predominance of effusion, now in one part and then in another.
while we can only ascribe it to some unknown individual peculiarity.

The more rapid the effusion into the areolar tissue, the more tense is the part, the more difficult also is it to make a dimple in it, and the longer is this dimple in disappearing. Sir Henry Marsh attribute these phenomena to the nature and viscosity of the effused fluid, while he thinks that the semitransparent appearance of an oedematous part in atomic dropsy, its doughy feel, yielding readily to pressure, while the marks of the fingers are rapidly effaced, are owing to the extreme tenuity of the fluids effused in these cases. It appears to me however that the abundant subcutaneous areolar tissue and fat, which exist in persons not yet wasted by chronic disease, and the absence of all except a very lax and hanging areolar tissue, in those who are attenuated to the last degree by long continued illness, have a more powerful effect in producing resistance in the one case, and diminishing it in the other than any mere difference in the effused fluids. The rapidity of the effusion also, no doubt contributes to render a part tense. In atomic dropsy, the fluid has been for a long time in a morbid state,
The skin is wasted in common with the other tissues, and in a manner macerated by the long continued contact of fluid; it is thin, pale, nearly bloodless, and thus when distended we can almost see the fluid through it. This thinness of skin, the cavity of cellular tissue, and the absence of subcutaneous fat, will I think also go a good way in explaining the ease with which the fluid is evacuated by acupuncture, when compared with acute dropsy.

Acute dropsy such as I have described, after increasing to a greater or less degree, and lasting a longer or shorter period, in the great majority of cases is completely removed, the absorption being accompanied by a more copious secretion of urine, which at this period is often increased to double or treble the normal amount. This process is often accompanied at its commencement by a copious excretion of tube casts, appearing either to be as if it were washed out by the increasing secretion; or their removal allowing the organ to resume its functions. The dropsy being entirely absorbed, the urine returns to its natural quantity and density, and the albumen, which during the process of absorption had been gradually
diminishing, altogether disappears, and the individual for a time at least is restored to his wonted health.

Exposure to the original causes of the attack, during the period of convalescence, is very apt to reinduce the symptoms.

In some cases the result is different. The morbid matters circulating in the system, produce effects incompatible with life. Inflammation is set up in vital organs, or gangrene occurs in the distended extremities, or most frequently of all, the urea acts as a necrotic poison, and the patient dies comatose.

What light does morbid Anatomy throw on the Pathology of this form of dropsy.

We often find numerous lesions referrible to preceding inflammatory action, affecting especially the serous membranes. Very frequently the peritoneum presents, besides the effusion, adherent and floating lymph. The pleuræ often exhibit similar signs of inflammatory action, and there is sometimes pericarditis. But then there is often none of these, and when they do occur, it is not as primary lesions, they merely supervene in the course of the disease. Inflammation of a serous membrane will
no doubt cause effusion into it; but in the
same case we find another serous membrane
not inflamed, and yet there is effusion
there also. Therefore inflammation is not
the essential pathological condition of the
effusion in these parts.

As regards the kidneys, we have seen
that they may present little or no structural
change, although their function has been
obviously and intensely deranged. These
cases are, however, the exception, and are
not yet numerous enough to found any
satisfactory reasoning upon.

In the great majority of cases there
are evident signs of structural change.
The kidneys are more or less enlarged,
being often double their normal size
and weight, and contain a large
quantity of blood. This is often irregu-
larly distributed, some parts of the
cortical substance being quite pale,
while others are engorged. The polygonal
vasculaity of the surface, is evident
or obscure, according to the amount of
blood in the organ, or in any particular
part of it. When the kidney is encepho,
the coarse vascular striae of the cortical
substance, which lead from the bases of
the pyramids, to the surface of the organ,
also present various degrees of vascularity.
Being very distinct when the organ is full of blood, and also in the congested parts of it when the vascularity is irregularly distributed. There is frequently signs of extravasation of blood into the tubes. On the surface of the kidney this is shown by dark red spots or petechiae, formed by blood contained in a bubble of a convoluted tube, where it rises to the surface and then bends down again into the cortex. On section, the same appearances are observed, and in some places the extravasation assumes the form of a longitudinal streak, from its taking place in some of the tubes which pass directly from the bases of the pyramids through the cortex to the surface, instead of becoming convoluted as the majority of them do on leaving the pyramids. This blood is no doubt derived from rupture of the Malpighian capillaries at the extremity of the tube, just as we often inject many of the tubes by forcing a fine injection into the renal artery.

The line which in the healthy kidney marks the boundary between the pyramidal cones and the cortex, and which in chronic disease of the kidney is so often obliterated, is not in this acute form much obscured, as the vascular system of the kidney has
not been sufficiently, or long enough, ob-
strueed, to obliterare the arches of anastomosing
vessels by which this line is formed. Ailing
to the same cause, the kidney can be generally
well injected.

On microscopic examination, we
find many of the tubes filled with epi-
thelemum, which being cast off from their
walls as single entire cells, or in masses,
collects in the cavity, while the process
reproduction is still going on, so that
finally the tube is often completely ob-
structed. Sometimes the cells thus thrown
into the cavity of the tube, seem to be
cemented together by a coagulable exudation.
The convoluted form of the tubes accounts
for the accumulation; as their very
circuitous and abrupt windings, tends
to prevent the passing out of the epithelium
as soon as thrown off. All the tubes do
not present this change. In many of
them we can detect nothing abnormal.
In the paler parts of the kidney previously
described, clumps of obstructed tubes are
found, and the obstruction seems to be
the cause of their exsanguine appearance.

The pressure produced by the distended
tubes gradually pressing on and pre-
venting the circulation of the blood
through the intertubular capillaries, just
as expulsiion into the air cells of the lung produces the essangnine appearence of that organ, seen in grey hepatitation.
In injecting the kidney, the pale portions are filled with more difficulty and less perfectly, than the other parts.

In the early stage, the capillaries of the Malpighian bodies are found engorged with blood, and appear to the naked eye as bright red spots. Subsequently the walls of these capillaries, naturally of the most delicate and transparent structure, become opaque.

In determining the relation which these changes bear to the disease, the points we must keep in view are, the diminution of the renal excretion, and the changes which it induces in the circulating fluid. Whether the affection be truly inflammatory or not, it has many characters in common with inflammation. The kidneys are intensely congested, as shown by the state in which they are found after death, and by the haemorrhage which occurs during life, which can be traced distinctly to congestion of the Malpighian plexus of capillaries. Such a state of congestion renders the circulation slow, and of itself consequently diminishes the amount of secretion. The congestion may be in part primary,
produced by the repulsion of the blood from the surface of the body, or it may be secondary, caused by their being called on to excrete materials normally thrown off by the skin. In the latter cause, Dr. Johnson attributes the desquamation of the epithelium, which forms a striking character of the disease. He thinks that the separation of these noxious matters from the blood, by the renal cells, modifies the latter, that they separate entirely from their basement membrane. Fresis, on the contrary, considers the desquamation to be mechanical, from the epithelium being entangled in the fibrin, which is exuded into and coagulates in the tubes. I cannot help thinking, however, that both these are common results of an inflammatory action. In while on the one hand, the mechanical action seems to be insufficient to account fully for the phenomenon, on the other we are familiar with the effect which inflammation has in causing desquamation of the cuticle, and the still more analogous separation of the epithelium of mucous membranes; while we have no reason to believe that any noxious material is being thrown off, but that the desquamation is solely the result of the change in the nutritive of the part.
Produced by inflammation. At all events, this abnormal state of the secreting cells must interfere materially with their secreting powers; and this is greatly increased when the tubes are blocked up by the accumulated epithelium, and the effused fibrin.

It is probable as I have already endeavoured to show, that some noxious materials are thrown on the kidneys for elimination. We know also that the presence of such matters obstructs the circulation through an organ. Blood charged with carbonic acid beyond a certain point will not pass through the lungs, and with difficulty even through the systemic capillaries. Whether this be the cause or not, there is evidence of obstruction in the intertubular capillaries, beyond that produced by the mechanical cause already mentioned. It is shown by congestion of the Malpighian capillaries, and it is to the congestion of the latter vessels that albuminous urine is generally attributed, the serum of the blood in fact transuding through them, as it does through the systemic capillaries when they are congested by nervous obstruction.

We have then in acute dropy, the blood impoverished by the draining off
of its albumen, when at the same time the
two principal excretorities of water
perform their office imperfectly. Thus in
default of excretion by some other channel
the bloodvessels become distended with
aqueous blood, which after reaching a
certain point, transudes on all sides
and general dropsey is the result.

Though these conditions seem quite
sufficient to account for the effusion
there is another circumstance which may
be taken into account. The frequent
occurrence of simple uncomplicated
hypertrophy of the heart in chronic
renal disease, seems to indicate that
the abnormal condition of the blood
renders its circulation through the systemic
capillaries less easy than natural. It
is obvious that retardation no matter
how produced, will increase the tendency
to transudation.

I have entered fully into this form
of dropsey, as I consider that the principles
here laid down, apply to all forms of
renal dropsey, and they can consequently
be considered in a much more summary
manner.
The dropsy which follows scarlatina is very analogous to the acute dropsy arising after exposure to cold. The skin plays a still more important part than we have seen it do in the latter. It has exhibited for a time increased vascularity, and this is followed by desquamation of the cuticle, leaving it tender and susceptible. It is generally at this period that, with or without exposure to cold, symptoms of febrile reaction set in and anaemia occurs.

The urine exhibits characters similar to those found in the form of dropsy just described. It is scanty or altogether suppressed and highly albuminous, and it contains blood discs, epithelium and fibrinous casts, indicating exudation into the renal tubes. In fatal cases the kidneys exhibit changes similar to those already mentioned. There are also very often found lesions in other parts indicative of inflammatory action, such as pericarditis, pleurisy and peritonitis. These I consider as secondary; they are certainly not essential. It is true we may consider them as common results of an inflammatory state of the system, acting as well on the serous membranes as in the kidneys. The latter however are primarily affected, and it
appears to me more reasonable to attribute the former to the irritation of urea, which is always contained in the effused fluid. The dropsical symptoms most commonly commence ten or twelve days after the rash disappears, but they may appear at any stage of the fever. They often ensue after premature exposure to cold, but this is by no means necessary. The dropsy usually extends through the entire subcutaneous cellular tissue, and into one or more of the pericavities. It is well ascertained that dropsy is at least as common after mild cases of scarlet fever as after the more severe forms.

Independent of the occurrence of effusion, and antecedent to it, there is evidence of an abnormal state of the renal organs. Dr. J. W. Begbie, [Ed. Monthly Journ. Vol. IX, p. 443] examined the urine carefully in 21 cases of simple scarlatinæ, not followed by dropsy, and found albumen in every instance. In 19 of these it appeared a few days after the commencement of desquamation. In the other 2 it appeared earlier, owing to the presence in the one case of blood, and in the other of pus; and in both it was notably increased during the process of desquamation. The average time it continued, was four or
five days; the extremes being two and ten days. The quantity of albumen present was usually such as to render the urine moderately coagulable. In these instances he never found the quantity of urine diminished though in the case of dropsy it was always scanty, and sometimes almost suppressed. In diuresial cases also, he never failed to find tube casts in the urine, usually with a dense deposit of epithelium, while casts were never observed in the albuminous urine where dropsy did not exist.

Dr. P. Newbigging [Ed. Monthly Jour. Vol. IX p. 1046] from the careful examination of 25 cases, arrived at the same results. The urine was in every case albuminous, especially during the process of desquamation, and this without any notable alteration either of its quantity or specific gravity. In five cases anaemia occurred, and the urine became greatly diminished, and more albuminous, and he considers that a diminution of this secretion may almost certainly be considered as the forerunner of anaemia. In these cases the specific gravity was not lowered, but this is readily accounted for when we consider the small quantity secreted. All the five recovered perfectly.
The invariable occurrence of albumenuria during desquamation, in every one of these 46 cases, is very striking. I have spoken sufficiently of the reciprocal functions exercised by the skin and kidneys. While the functions of the former are so much interfered with as they must be while the cuticle is separating, the kidney is called on to perform extra work. Dr. Newbigging observed that the quantity of urine during desquamation was even greater than in health. We have seen reason to believe that besides the mere water, poisonous materials are also thrown on the kidneys. The poison of scarlatina too may be supposed to act on them, but it seems unnecessary to call in such aid, when the ordinary poisons of the system are sufficient to account for the phenomena. Now the extra work seems to induce a state of hyperemia in the kidneys, causing a certain amount of serum to transude through them; hence the albumen. Usually as the skin regains its normal state, the kidneys are relieved, and regain their normal state. We can readily understand however, how the state of hyperemia will pass on into intense congestion or actual inflammation. The patient becomes feverish;
The renal epithelium is thrown off; casts form in the tubes, the urine becomes more albuminorous and very scanty. The skin cannot perform its reciprocal action, it is not fit to execute its own functions. The patient is debilitated by the previous febrile action. Thus the blood already impoverished, is further diluted, and the blood vessels distended with the fluids, which cannot escape by their natural outlets. Dropsy is the natural; I might almost say the inevitable result.

Dropsy occasionally supervenes during the desquamative stage of measles. The urine has the same morbid characters as in dropsy after scarlatina, and the kidneys present similar lesions. I consider the pathology of the effusion as quite identical with that following scarlet fever.

When acute dropsy, arising from any of the causes I have mentioned, does not prove fatal by uraemic poisoning, hydrothorax i.e. the kidneys and skin gradually resume their functions, the dropsical effusions disappear, and the urine ceases to be albuminorous. The patient in fact is restored to perfect health. For a long time after the connection between organic disease of the kidney and
albuminuous urine was pointed out, undue importance was attached to the latter condition, and a person who had suffered an attack of acute dropsy and albumenuria, from exposure or following puerperal fever, was regarded as doomed to perish at no distant date, from chronic disorganization of the kidneys. Experience corrected this error. There is no reason why a kidney should not recover from an attack of inflammation as well as a lung; or why exudation should not be removed from the tubules of the former as well as from the cells of the latter.

A foot however which has once suffered from disease, is more liable to be attacked by it again, though it has been perfectly restored both in structure and function, and especially so if the patient is again exposed to the causes which first induced it, and this is very likely to happen in the case of renal disease. A frequent history of acute dropsy, is one of repeated attacks, occurring often at long intervals.

In Jan. 1852 I saw a man in the Peath Hospital, with great anasarca and considerable effusion into both pleurae and into the peritoneum. He was a labourer, aged 36. The dropsy commenced after exposure. The urine was scanty and albuminous. Eight years previously he had a similar
attack, from which he perfectly recovered. Under appropriate treatment he recovered from the second attack also.

John Huyett, 73. A tailor was admitted into Ward 1 of the Royal Infirmary on the 23rd Feb. 1853. Seventeen years before he was confined to the house for six weeks with swelling of the legs. Does not remember if he had then pain in the loins but had severe headache. Since that time pays he was in perfect health, and had no return of swelling in the legs till the previous April. He was not then exposed to cold. Had severe headache, and this and the swelling continued till September, when he had great diarrhoea for five days, rendering him very weak, but carrying off both the swelling and the headache. The swelling began again in a few days after the diarrhoea ceased, beginning at the feet and gradually extending over the whole body. On admission the entire body was anasarca, pitting on pressure. Fifty oz. of urine was passed in the last 24 hours. It had a sp. gr. of 1014 and yielded a coagulum of one half its bulk. It contained casts filled with fatty granules, and also epithelium cells, some of which contained fat globules. Under a diaphoretic and subsequently a diuretic treatment,
he was much relieved, and was dismissed at his own request on the 16th of March.

Archibald Wright [Dr. Christians 20th Case] who at the age of 55 had an attack of anasarca after exposure and who had not the symptoms of chronic renal degeneration; had general dropsy 20 years previously, subsequent to an accident, and again five years before the present attack, after exposure to cold and wet.

In Jan. 1853 I saw a man named McKay who was admitted into the Royal Infirmary, Ward 1, having become recently affected with dropsy and albumenuric.

Twenty years previously he had been treated there for an attack of dropsy; and in that long interval had been quite free from it.

In such cases we cannot suppose that the patient has been labouring under a progressive disease of the kidneys, though at each of the periods we can have little doubt that they were affected.

In other cases we find that a patient, who now presents all the symptoms of advanced renal disease, has been attacked suddenly with dropsy, perhaps after exposure, it may have been years before. The man Stewart* had such an attack, five years before presenting himself when he

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again became diarrhoeal, and he had then the most characteristic symptoms of renal disorganization. This also occurred in the following case.

James Smith, aged 38, A Carter, was admitted into Ward I of the Royal Infirmary on the 25th Nov. 1852. He enjoyed good health until three years and four months previous when he was seized after standing in a cold draught of air, with swelling at the ankles, which in four days extended up to his thighs. He was then in the Royal Infirmary for three weeks, and the swelling was removed. A year after he had a similar attack and was again relieved. From this time he was well until four months before admission, when he began to feel slight shortness of breath and beating at the heart. Four weeks ago he again had swelling at the ankles. On admission there was found to be slight irregularity of the heart's action, and a loud flowing murmur with the first sound, loudest at the apex. The legs pitted slightly; the skin was dry.

Nov. 28 Passed 66 oz. of urine in 24 hours, pale and having a sp. gr. of 1013. The sediment shows numerous fragments of desquamated casts, some of them very long, some containing nuclei and granular cells, some or less fatty, and some filled with minute fatty molecules.
She was dismissed very soon after at his own desire, and was readmitted on the 24th Dec.
A week after going out he got cold, and a severe cough which still remains. The ankles, chest, arms and loins put on pressure. Passed 50 oz. urine in 10 hours. Sp. gr. 1013. It was very coagulable and contained numerous casts.
Complains of intense thirst unrelieved by water. He was ordered a warm bath every night. Jan 1st. Urine 90 oz. and very coagulable. Swelling of legs much diminished. The skin remains dry and he has never sweated. Jan 6th. Oedema quite gone. Great thirst, and the urine in large quantity. Jan. 12th. Casts still present crowded with fatty granules. Jan. 15th. One hundred and thirty ounces of urine passed in the last 24 hours. Thirst still great. He now considered himself well and was discharged in this state soon after.

The next case is probably an instance of renal disease originating in scarlatina.

Sarah Wilson aged 7 was admitted into the Royal Infirmary Ward XI Nov. 11th 1853.
She had swelling of the abdomen, and of the feet and legs which pitted on pressure, also vomiting and diarrhoea. There was general jaillor of the surface, and slight puffiness of the face. She had scarlet fever three or four years before. It was not ascertained whether this was followed by dropsy.
stated that the swelling commenced in the previous summer, but that she was able to run about till a few weeks before admission, when she was suddenly seized with a fit at school, after which the swelling increased and she was confined almost constantly since. The diarrhoea commenced with the swelling, and continued more or less up to admission. The urine could seldom be examined on account of the diarrhoea. On the 26th it was found to have a sp. gr. of 1000 and to be moderately coagulable. The face became so much swollen that the eyes could hardly be seen. The dropsy continued undiminished until the 9th of Dec., when it began to grow less, and the next day it had entirely disappeared. The urine and faeces were passed involuntarily. For five or six days before this she was very drowsy and slept almost constantly. This continued until the 13th, when she died, the oedema not having returned.

\textit{Ostro-Cadaveris.} The lungs contained some nodules of chronic tubercle, there was a small cutaneous concretion in the apex of the right one. The heart was normal. The kidneys were enlarged, weighing together 674 oz. On stripping off the capsule, they presented a mottled appearance, from the presence of much and irregular vascularity. On section they presented a well-marked tawny appearance. The enteral
Purition was of a pale yellowish colour, the striae were generally absent or indistinct. At some places there was a number of opaque yellowish spots. An microscopic examination a quantity of fat was found in some places but this was in isolated spots and did not occur very frequently. The Liver contained much fatty matter and its cells were very indistinct. It had a sp. gr. of 1050. The Spleen weighed 2½ lb. It was firm, and on section appeared to be almost entirely made up of enlarged Malphigian bodies. There were tubercular ulcers in the lower third of the small intestine, quite surrounding the gut. The mesenteric glands were much enlarged, and infiltrated with tubercle.
From these facts we must come to the conclusion, that inflammatory action in the kidney, although it is by no means necessarily followed by permanent and progressive disease, yet that it often is the starting point of such disease. This is no more than what we observe in other organs, especially in those which like the kidney are multiple, or composed of an immense number of parts similar to each other. A few renal tubes, a few lobules of the liver, or a few air cells of the lung may be altered or obliterated without producing any sensible effect; but inflammatory action may originate a change of the whole organ, resulting in cirrhosis of the liver or lung, or degeneration of the kidney.

We must also keep in view the possibility, or rather the probability, that in many cases of dropy setting in with marked febrile symptoms, the kidneys have been weakened by disease which has crept on insidiously and unsuspected, until when subjected to an unusual stress, they have proved unequal to the task.

This brings me to the subject of dropy depending on chronic renal disease. I do not purpose entering at great lengths on the morbid anatomy of the chronic disease of the kidney; but merely to keep these lesions
in view, as far as relates to the causation of dropsy.

I have stated my reasons for believing, that chronic disease of the kidney has sometimes its origin in an acute attack. I also believe that any of the forms of chronic disease may arise in this manner, according to the constitutional tendencies of the individual affected. Most frequently, however, they begin slowly and insidiously, and do not attract attention until some secondary affection has been produced.

Bright's disease of the kidney, which includes its chronic diseases, has been divided into many different forms, and these again into different stages. All these again have been made to coalesce in various modes, and new forms and stages have been added, so that the complexity of the subject has increased with its cultivation. Each author furnishes a new list of terms and it is often impossible, to determine the relation which these bear to those of his predecessors. We find forms of disease described in recent works, under different names, and when we closely analyse the anatomical changes allotted to each, we can observe little difference. Ultimately we see, that the divisions, and the names, are founded on certain symptoms observed during life,
and which are supposed to have their exponents in different lesions. Now if all these lesions exist, and if they are essentially different, I believe we have not, except to a slight degree, arrived at their differential diagnosis during life. We can determine with a good deal of accuracy whether organic disease exists or not; and in some cases we can arrive at general conclusions as to its nature.

Chronic renal diseases result, I believe, from certain cachectic states of the system. The exceedingly frequency with which they are found associated with tubercular diseases distinctly points out the strumous habit as at least a predisposing cause. They often arise also in the gouty constitution; and perhaps they can be attributed to the habitual and excessive use of alcohol, more frequently than to any other single cause.

The morbid processes which are thus set in action cannot I think be limited to any particular tissue of the organ. They affect of course primarily, and principally, its glandular parts; and thus distinctly intimate, that the lesions are connected with its secreting functions. But I have not been able to satisfy myself, that disease originates in, or affects in an especial manner, any
one of the structures of which the secreting part of the organ is composed. Blood vessels, basement membrane and epithelium are all diseased, and we can scarcely imagine how they could be separately affected. The morbid process originates in the blood, very probably or rather in the system, for diseases of the blood are diseases of the entire organism. We may express this by abnormal nutrition of the gland, or by saying that it is called on to execute some function or functions which act injuriously on it, and this is likely the case, but if we keep nothing else in view, our notions of the pathology of the affection will be very imperfect.

It is probable that the morbid process is attended, at its commencement, with an increased quantity of fluid in the kidney. We draw this inference as well from the fact of chronic disease following on acute, as from what we observe when an opportunity occurs of examining the kidney while the symptoms are still recent. We may call this state congestion or chronic inflammation; but it is likely connected as a consequence, with the abnormal secretion going on in the gland.

The structures of the kidney gradually undergo an alteration. The
general character of these changes, is, I believe, in the first instance, a thickening or hypertrophy; and this is, in some degree, explained, by the increased vascularity and tendency to exudation which exists. Dr. Johnson describes hypertrophy of the arterial coats as a prominent lesion in certain forms of renal disease; and he draws some very hypothetical conclusions from this fact. It is true that the arteries are thickened, but it is only as a part of a general change of the same kind, and not as a result of any fancied obstruction at a particular point of the circulation.

This state of things goes on to different degrees in different cases, just as happens in diseases of other organs, and the kidneys present different appearances, according to the amount and duration of this change, and to the quantity of exudation in the tubes. When the hypertrophy and exudation exist to a considerable degree, it constitutes the pale yellow degeneration — the waxy kidney of Dr. GaIRDNER. The kidney presenting this appearance is very firm and often greatly enlarged. I have seen them three times the natural size. This increase principally depends on thickening and dilatation of the tubes. The external surface is pale and smooth, the polygonal vascularity is greatly obliterated,
and the stellate veins are prominent and full of blood. On section the cortical substance is pale, and more or less translucent when held between you and the light, in some cases being quite similar to the section of a cognac pear. It is so luminous often double its natural depth, and this appearance is increased by the obliteration of the vascular line which separates the bases of the pyramids from the cortical substance. The pyramids appear to be teased out at their bases, and some of the strie formed of bundles of tubes can be traced continuously through them, quite to the surface of the kidney. The Malpighian capillaries are sometimes fully injected when these bodies appear as minute bright red grains scattered through the cortical substance. More generally they are pale.

The appearances presented indicate a diminished vascularity, and this probably arises from the diseased state of many of the tubes, which no longer exercising a secreting function cease to be supplied with blood for that purpose. It is possible also that the exudation into the tubes presses on and obstructs the capillary circulation to some extent; the fulness of the vessels, being in general found to stand in an inverse ratio to that of the tubes. From whatever cause, the
The kidneys whether they have attained the characteristic appearance of the so-called waxy degeneration or not, gradually lose the vascularity which they possessed at the outset of the disease. The capillaries of the cortical substance become obliterated, as shown by the loss of the polygonal vascularity on the surface, the small veins bounding these polygons, deriving their blood directly from the intertubular plexus. They thus assume more and more the appearance of non-vascular structures.

Many portions of the kidneys being thus incapable of performing their functions, while at the same time they are sparingly supplied with blood, further changes ensue. It is a law in the animal economy, that portions of the organism which have ceased to perform their functions become atrophied, and the kidney is no exception to this. It is denied indeed, that the waxy kidney ever suffers atrophy, but so long as we are unable to diagnose that particular form during life, if the lesion is compatible with life, and if the patient lives, we are entitled to infer from analogy, that it forms no exception.

When the desquamative process continues, the basement membrane produces an abortive epithelium, and ceases at length to form any. The tubes become flattened and are obliterated, and by the continuation of
This process the kidney shrinks and its surface becomes irregular. The tubes of the pyramidal cones also become atrophied, subsequently to the wasting of the cortical portion.

Thus far I have considered chronic renal diseases as being essentially similar in their nature, and only presenting different anatomical appearances, according to the special development of the disease, and the period at which it comes under our inspection. I have also viewed them as results of a constitutional cause or vice, and this is very much strengthened by the analogous lesions of other organs, which we find associated with them. Of this kind is the waxy degeneration of the liver, where it is firm and much less opaque than natural, and on section yields little juice to the knife. The hepatic cells, seen under the microscope, are irregular in shape, and have a peculiar transparent appearance. The spleen also undergoes a waxy degeneration, in which its Malpighian bodies are very large and transparent, like grains of boiled sago.

It has very frequently occurred to me to observe the concurrence of this diseased state of the kidneys, liver, and spleen in persons dying of phthisis.

There is another condition of the kidney to which I conceive undue importance has been attached; that is fatty degeneration, but is not
unfrequently found in the renal epithelium, when the kidneys have not shown the slightest disorder of function, and no other trace of structural change. This I have frequently seen in persons of a fatty diathesis, when the subcutaneous fat was abundant, the hepatic cells contained more oil than usual, and some fatty granules might be found in the muscular fibres of the heart, though their transverse strie were quite distinct. This cannot be regarded as a disease, either of the kidneys or of the other organs. There is an excess of fat in the system, and it is merely deposited in healthy parts, where when it is less abundant, it is found in less quantity or not at all.

In the normal state, we find fat deposited throughout the body, where it is least likely to interfere with function, stored away as it were for an emergency in every hole and corner which is not otherwise occupied. This is true of the subcutaneous circular tissue generally, and more strikingly of the hollow shafts of bones. In disease this is still more evident. Whenever the function of a part is lost or impaired, fat is deposited in it. The muscles of a paralysed limb undergo a fatty degeneration. When the testes cease to perform their function from age or disease, fat is deposited in them. When the
fibres of the heart become diseased, and when they contract languidly, and some of them, perhaps not at all, fatty molecules are found in them. So also when pus remains long in an abscess, when its corpuscles have attained their full development and begin to retrograde, they become fatty.

Now the loss of power in a paralyzed muscle does not occur from the deposit of fat in it. The latter follows on the disorganization which results from inactivity of the muscle. The same is true of the other examples. In fatty degeneration of the heart, the characteristic transverse strie of the muscular fibres are found to become indistinct or to disappear before fat is deposited.

When these principles are applied to the kidney, we will reason to believe that the fatty deposit which is so frequent is not the cause of the disease, but the consequence of the functions of the organ, or of some part of it, being impaired or destroyed. I will not therefore consider fatty degeneration, as a particular form of renal disease, but only look on it as an occurrence which may take place in any of the varieties.

Though the deposit of fat is not the original cause of disease, yet it is the cause of diseased appearances; and may perhaps by its accumulation, act as a secondary cause.
of motile action. In some cases the fat is found in the epithelium throughout the organ, without any special accumulation. The cells are generally enlarged, and when they contain much oil, they lose their characteristic appearance. The kidney is usually large, and it is opaque in proportion to the amount of fat. It frequently occurs in the well-marked waxy kidney, and we may often recognize the existence of fatty deposits by its translucency being diminished, and this varying degree of opacity arising from the equitable distribution of fat, gives rise to the appearances described as pale yellow, fawn colour, &c.

More frequently the fatty deposit occurs at particular points. I have already described the blockings up of tubes by desquamated epithelium. Now when fatty matter is being secreted into these cells, the tubes become filled with fatty epithelium, and the deposition of fat in them seems to continue. Several contiguous tubes are affected in the same manner, and thus a little mass of fatty matter is formed at that point. Sometimes there are a great number of these, and sometimes only a few scattered throughout the kidney. They appear as opaque white spots. These are the granulations of Bright. When a section of one of them is placed under the
microscope, the contiguous parts of several tubes are seen filled with fatty granules and globules of various sizes, giving the fluid a dark appearance. The deposit is not purely fat for the globules do not coalesce, as particles of oil do when brought in contact. They are evidently little masses of oil, surrounded by a delicate membrane of a different nature, probably albuminoid.

As the kidney contracts by obliteration of the tubes, the granulations which are near the surface become prominent, by the shrivelling in of the intermediate parts, and thus are formed the most frequent irregularities observed on the surface of atrophied kidneys. By the continuance of the process of contraction, the surface becomes still more irregular, assuming a tuberculated or lobulated appearance, and the fatty deposit which has previously taken place, may be in a great part remodeled.

In the forms of disease which I have described, both kidneys are similarly diseased; and this forms another argument in favour of the constitutional origin of these affections. One of them is often found in a more advanced state of disease than the other, and occasionally the difference is very considerable.

In connection with the deposit of fat in the kidney, we must consider the tendency to a morbid deposition of fatty matter, which
exists in certain constitutional diseases, such as phthisis, caries of the vertebrae, and other phterous affections; where although the subcutaneous adipose tissue disappears almost entirely, yet there is often an abundant deposit of fat in internal organs, and the fatty liver is often associated with fatty kidney &c.

In explaining the dropsy so often connected with the lesions described, we are met by several difficulties. Sometimes dropsy does not occur at all, or occurs only in the slightest degree, and the organic change does not afford any explanation of the symptoms it is the same or perhaps greater than what is found where the dropsy has been extreme. We also find that in the course of renal disease, dropsy often appears and disappears, when the reason is not very evident. I believe that these apparent anomalies are applicable by keeping in view as I have done in other varieties of dropsy, the connection between organic disease and the modified states of vital action.

In speaking of the transition of acute to chronic disease of the kidney, I mentioned that we could often trace a history of several successive attacks of dropsy accompanied by more or less acute symptoms and occurring at longer or shorter intervals.
From the causes which I have already mentioned, as exciting causes of acute dropsy, may produce a more or less rapid effusion in any stage of renal disease, and a similar explanation will apply to it. The kidney has increased work thrown on it to which it proves unequal, the urine becomes scanty, the vessels are distended and effusion is the result.

As the disease advances however, the blood undergoes a great alteration, its albumen is continually passing off in the urine, so that its amount may be reduced one third. The colouring matter undergoes a still more remarkable and constant diminution, being sometimes reduced to one third its natural amount, and this produces the characteristic pallor. These changes render the serum much more liable to transude, and effusion takes place under proportionally less powerful exciting causes. One of the most striking features of the disease, is the dry un perspiring skin which we found existing in the acute form, and which is still better marked in the chronic, so that for many months the patient may have had no perceptible perspiration, and all our resources may be inadequate to produce it. In these circumstances it is not strange that when the urine becomes scanty
Dropsy soon follows, if diarrhoea or some other evacuation does not produce the necessary relief. As a general rule, dropsy is preceded and accompanied by a diminished secretion of urine, and the sequence is particularly striking when, in the course of the disease, it becomes suddenly scanty with symptoms of febrile reaction. There are many exceptions however to this, where the urine is not only not diminished, but where it is greatly in excess of the normal quantity, and yet the dropsy remains or even increases, and we may sometimes observe the dropsy and the urine decreasing together. Dr. Christian says that all cases of dropsy in which the urine is in larger quantity than natural, occur in connection with Bright's disease, with the exception of those which attend the advanced stage of pachydrmic diabetes. How are such cases to be explained?

I have already considered at sufficient length the relations of the various fluid evacuations to each other, and to the occurrence of dropsy. We must now view the evacuations and the dropsy in reference to another circumstance - the quantity of fluid ingested. The urinary and cutaneous secretions are put down at a certain normal average amount, but it is evident they can only be so in relation to a certain normal
average amount of fluid received into the system. A healthy person may pass almost as much urine as he chooses, by drinking a sufficient quantity of water while he remains inactive in a cool atmosphere. We can readily see then, how the urinary excretion, although far greater than usual, may be still actually deficient. We find that in those cases where the quantity of urine is much increased, the patient is tormented with thirst, to allay which he drinks a great deal. The thirst is not the consequence of the increased secretion, but its cause; and it arises from the morbid state of the system induced by the renal disease. I do not know that the thirst can be attributed to the retention of urinary excrement in the blood, as in such cases the excretion of solids is usually large and often in excess.

Now although the urine, when in very large quantity, is usually less coagulable than when it is scanty; yet when we take the total amount of urine into account, the proportion of albumen excreted is very large, greater in many cases I believe than what occurs in any other circumstances. I am not aware of any analysis having been made of the blood in such a case, and this for obvious reasons, the state of these persons not permitting much less requiring deprivations. We know well however,
from the experiments of Dr. Christison, that the drain of albumen by the kidneys, invariably produces a corresponding and proportionate diminution in the density of the blood serum. I attribute the dryness which occurs in such cases, to the excessive attenuation of the fluid so produced, and I consider it analogous to the effusions which occur in anaemia, chlorosis, etc., where the osmotic of the blood is sufficiently diminished to allow of its transudation, independently of the tension of the vascular system produced by the retention of excretaitious fluids. The following case is a good example of dryness occurring under such circumstances.

John Stewart, a comb maker, aged 35, was admitted into Ward 1 of the Royal Infirmary July 16th 1851. Five years previously his feet and legs became swollen, by which he was kept from his work for a fortnight. Seven weeks since his legs began to swell especially at night, and about the same time he lost his appetite, had acid excretions and intense thirst. On admission the dyspeptie symptoms and thirst continued, the skin was dry and there was slight edema of the feet and ankles. The urine was somewhat deficient, op. gr. 10.8 and highly coagulable. Aug. 7th urine g. 60. op. gr. 10.8 and intensely coagulable. On the 18th it was g. 50.
Sp. gr. 1010, less coagulable, and very little oedema of the legs. On 24th 110 oz. coagulability diminished though still great. He was now drinking rather more liquid than previously. On 30th 120 oz. sp. gr. 1011. Legs much distended, the skin being very tense and clear. Large doses of doses and antimonial powder did not produce the slightest diaphoresis. On Sept. 7th the urine had increased to 140 oz. sp. gr. 1008, and on the 12th to 170 oz. sp. gr. 1010 highly coagulable, but less so than at first. For the next four days the urine was from 150 to 170 oz. less coagulable, and the oedema was much less. During the next week the urine was from 125 to 135 oz. daily of sp. gr. 1010, and the legs were reduced to nearly the natural size. A fortnight after on Oct. 16th he passed 150 oz. of urine, which yielded a considerable coagulum. He left hospital on the 20th Oct., considering himself well enough to work. The urine which had been very pale was then of a better colour, had a sp. gr. of 1013 and yielded a small coagulum. The limbs scarcely pitted on pressure, but were always fuller towards night.

He was readmitted on the 18th Jan. 1852. Since leaving hospital he was engaged in his usual occupation, and the urine had remained pale, and amounted to 50 oz. daily. On Admission the urine was found
to be very albuminous, and epithelial cells and granular casts were observed in it. The skin was very dry, and he stated that he had not perspired in the slightest degree for six months. His feet and legs were somewhat oedematous, and he had excessive thirst. On the 23rd he passed 140 oz of urine. From this time the quantity gradually decreased. On Feb. 27th it was 72 oz. of urine. During the same period he was becoming more and more dehydrated, and he died comatose on the 29th.

Section Cadaveris

The lungs were a little oedematous and congested. There was universal adhesion of the pericardium, by cellular tissue, not very firm. Over the heart itself was normal but small. Liver and spleen normal. Kidneys were small, pale and firm, and constricted on the surface. The cortical substance was atrophied, the vasculæ ovariæ and many of the Malpighian bodies were obliterated. There were no granulations.

The brain was rather pale, but nothing decidedly abnormal was found in the brain. The serum was small in quantity. Both the serum and the brain were analysed, and urea was found in both. 3% of the serum gave an alcoholic extract, a single drop of which, when observed under a power of 30 diameters, yielded on the addition
of nitric acid, an abundant precipitate of nitrate of urea.

It may be said, why do not the kidneys which are able to drain off 150 or more pounces of fluid, take away the remainder also? How I am not aware that dropsey ever occurs to a great extent in such cases, at least I have never observed it. The effusions are similar to the partial ones which occur in anemic states, and also resemble them in the transparent appearance of the dropsical parts, and the great ease with which they yield on pressure, which Sir Henry Marsh has so well described as characteristic of atomic effusion.

The dropsey which sometimes occurs in the advanced stage of diabetes melitida may be mentioned in connection with the so-called diabetes puerus just spoken of. It is attributable to similar causes. Although enormous quantities of urine are passed, yet the vital fluid is so impoverished by the large amount of solids excreted along with it, that passive effusion occurs.

The effusions connected with renal disease in all its forms and stages, one of the nature of general dropsey, affecting when sufficiently developed, the muscular tissue throughout the body, and the serous cavities
as well. This is what we would expect the cause being general. Anasarca however is the prominent form and that which is first apparent. The serous paees are only affected as part of the general surface, and the effusion into them does not reach anything like the degree to which it attains when arising from a cause which acts on a serous membrane in an especial manner. Sometimes however such causes are also in operation, and produce their special effects.

In all forms of renal dropsy there is an attenuation of the blood; in the acute form and in the subacute accessions, by the loss of albumen; subsequently by the excessive diminution of the colouring matter, and when much albumen is excreted in the chronic form of disease, both are deficient. Sabatier attributes the dropsy to this state of the blood alone. Solon repeats this, and Christian gives it a partial assent. Putritiansky states Sabatier's views and gives them a tacit approval. The attenuation of the blood no doubt exercises a most important influence, but it is alone insufficient to explain all the phenomena. If we even suppose it capable of accounting for all the cases in which dropsy does occur, it will not explain those in which it does not occur; in the many cases in which it appears only at intervals, again
If it were the sole cause, the dropsy should be proportionate to the degree of albuminosis, but this is very far from the fact. In the case where Dr. Christison found the solids of the blood most deficient, [No. 14] being only about one half the normal amount, at the time the blood was drawn, the dropsy was only "some oedema of the legs and hands and a little puffy swelling of the face" but he was passing five pounds of urine daily. In the case where the diminution of solids was next in degree, [No. 7] there was oedema and effusion into the serous cavities, but there was suppression of urine. In Case 10, where the haematosis was most deficient, being reduced 70.4 cent, there was no oedema, but the urine was 9 lbs. Some weeks previously the oedema and ascites, which existed before that time, disappeared, while the urine was only 12 oz.; but for some days previously he had profuse and long continued night sweats preceded by rigors in the evening. In this case the albumen of the blood was not diminished, but rather in excess. In case 20 the albumen was reduced 35.8 cent, and there was considerable oedema of the legs, but the skin was dry and the urine only 12 oz. When this man was dismissed three months after, he was leucophlegmatic.
The next p. Its not the same occurrence of the others, but divided by the albumen. General sneezes in the constitution of the texture of the body, of the necks to may exist in different manners—becoming a difference in the facility of escape of an injury fluid or to come injury, but colic having the object of albumen is the general cause.
the urine was ten pounds daily and very coagulable. There can be no doubt, that if his blood had been then analysed, it would have been found extremely attenuated, and deficient, both in colouring matter and albumen, yet he was free of oedema.

While then I believe that effusion may sometimes occur to a certain extent, from attenuation of the blood alone, the circulating fluid not being in excess; I also think that in the great majority of cases of dropsy connected with diseased kidneys, the proximate cause of the effusion, is the distension of the vascular system, by the aqueous fluids which cannot escape by their natural outlets.
Chapter IV.

Ascites.

The forms of dropsy hitherto considered have been general, and the causes from which they arise are such as to affect the entire vascular system, and the whole mass of the circulating fluid. I have now to consider the most important variety of local dropsy, and under the head of ascites will only include those effusions into the peritoneum which have a local origin.

Diseases of the liver are the most fruitful source of ascites, at least in this country, and that form which Laennec, denominated cirrhosis produces the most striking examples of it.

It is only of recent years that we attained anything like a correct knowledge of the structure of the liver, and of necessity its morbid anatomy remained in still greater obscurity: its principal alterations being referred to the relative hypertrophy or atrophy of certain imaginary red and yellow tissues of which the organ was supposed to be formed. Mr. Stiernan and more recent
observers, have laid a better foundation on which to base pathological research, but the superstructure is still anything but perfect.

The pathology of cirrhosis is peculiarly unsatisfactory. It has been ascribed to inflammation of the capsule of Glisson, and there the matter has been often left. This capsule represents the entire fibrous tissue of the normal organ; and the inflammation is inferred in order to account for an increase in this tissue.

The Cirrhotic liver of Laennec, the granular liver of Retzius, the hothaired, gin drinkers or whiskey lives, is usually much reduced in size, and greatly altered in shape. The surface is commonly very irregular as indicated by the terms granular and hothaired. Sometimes the irregularities consist of a number of large masses, separated by depressions. More generally they are small, and may be all of the same size, or they may be of different sizes which is the most common. The organ is firm and tough, and cuts like firm bacon or sometimes almost like cartilage. The colour varies, owing to the quantity of blood and bile present, and the proportion of fibrous tissue.

On section the structure can be more distinctly traced; the granulations or nodules are seen to consist of one, or more
generally of a group of lobules, according to their size. These are separated from each other by fibrous tissue, which varies greatly in quantity; sometimes being only sufficient to appear as a boundary line between the modules, and sometimes so abundant as to form the predominant structure of the organ. In the former case, it is the margins of these boundary lines, which being apparently drawn in, form the grooves separating the modules on the surface of the liver.

The size of a cirrhotic liver varies greatly. It is often reduced to one half or even one third its normal size. Portal mentions a case, where the liver in a case of ascites was but larger than an ordinary apple. The smallest adult cirrhotic liver I have seen weighed 1 lb. 13 oz. It occurred in a woman aged 35. On the other hand it may be greatly enlarged. During the present winter I saw a boy under the care of Dr. Bannatyne in the Whitworth Hospital Dublin, who had an enormous liver which proved to be a well marked example of cirrhosis. He was fourteen years of age, but of very small growth, yet the liver weighed 4½ lbs. In Dec. 1852 I was at the examination of the body of a man named Kerr, who died in the Royal Infirmary. He had laboured for a long time.
under ascites with enlargement of the liver and spleen. The former weighed ten pounds, and was the most complete example of cirrhosis, so far as atrophy of the hepatic tissue was concerned, that I ever saw. The great bulk of the organ was formed of a pale slightly yellowish fibrous tissue, through which lobules or small groups of lobules of glandular tissue deeply tinged with bile, were studded at intervals. The surface was smooth, and this agrees with the remark of Kotitsansky, that the fibrous tissue and the number of granulations, are usually in an inverse ratio.

Some of the names applied to this disease, indicate the cause to which it is generally attributed. There can be no doubt that the use of intoxicating, and especially of distilled drinks, is a frequent exciting cause; but it is by no means an exclusive cause. Though it usually occurs in adults, yet sometimes it is observed at so early an age as to preclude intemperance, as in the case of Dr. Banks already referred to, and also in a case which Dr. Gordon brought before the Pathological Society of Dublin in the 10th Dec. last. It occurred in a boy aged 15, who had suffered from an affection of the liver from five years of age, when he was
jaundiced and treated for inflammation of the liver. Since that he had been subject to epistaxis, and occasionally diarrhoea. The liver was small. In a delicate boy about 14 years of age, whom I saw in the Great Hospital in the winter of 1851-52, the origin of the disease was attributed to an injury from a fall received a considerable time previously, and which was followed immediately by vomiting of blood. He had enormous ascites for which he was twice tapped. The liver was a characteristic example of cirrhosis. This state of the liver also occurs in some of the lower animals, where of course, in temperance, cannot excite it.

These differences both in the origin of the disease, and in the appearances of the liver, suggest the probability of differences in the nature of the lesion itself.

The explanation commonly given is, that inflammation of the capsule leads to the exudation of lymph into the portal canals, causing in the first instance, enlargement of the organ. Subsequently the lymph contracts, and in so doing, by its pressure produces absorption of the hepatic tissue, and contraction of the portal canals.
Now it seems to me that this is beginning at the wrong end. The enlargement of the liver said to exist in the first stage, is I think founded more on theoretical grounds than on actual observation. The deposition of lymph being supposed, increase of size was inferred as a necessary consequence, and this state being believed in, there was then the danger of its being diagnosed on insufficient grounds. I doubt very much whether such a degree of enlargement as would likely be produced by the cause in question could be safely diagnosed in an organ like the liver, the size of which is so liable to vary from the quantity of blood it contains.

The idea of pressure on the glandular tissue, arises no doubt from the appearances of the fibrous tissue occupying the grooves between the nodules, the latter being pouted off and projecting. This readily enough gives the notion of the force pulling in the latter. The position of the fibrous tissue may I think however be otherwise explained.

I believe cirrhosis of the liver is primarily and essentially an atrophy of the gland substance; certain lobules of which
being rendered unfit to fulfil their secreting functions, diminish in size, and the cells composing them undergo further changes. I have observed three forms of cirrhosed liver. One in which the remaining hepatic cells did not differ much from the normal state; another in which they were fatty, and a third in which they had the waxy character. This seems to indicate, that cirrhosis may commence in either a healthy, a fatty or a waxy liver; unless we suppose that the latter state supervene subsequent to the atrophy.

In every case of cirrhosis the proper secreting tissue of the liver is diminished. We can understand how such atrophy may arise from the abnormal state of the glands, induced by the presence in it of noxious materials such as alcohol. We can also readily suppose an atrophic process occurring in a liver previously diseased, as when it is fatty or waxy. In all these cases the absence of the glandular parenchyma may be accounted for by the absorption or alteration of fronts which have ceased to perform their functions. But whence comes the fibrous tissue?

In a great many cases of cirrhosis I think it is not necessary to suppose any new tissue formed in the organ.
When a great deal of the gland substance is atrophied, the fibrous tissue which remains is in much larger proportion to the remaining gland substance than in the normal state. The multitude of minute blood vessels too, which cease to carry blood when the lobules they supplied ceased to exist as such, are no doubt converted into fibrous tissue. In this manner a liver when it is reduced to half its bulk, may present a considerable amount of fibrous tissue, without any new material having been actually deposited.

In other instances the fibrous tissue is too abundant, and the organ not sufficiently reduced in size to allow of this explanation without admitting some additional source for that tissue. I think this source exists in the glandular part, the hepatic cells as they become unfit to perform their functions being converted into fibrous tissue.

The cases in which the liver is increased in size, present greater difficulties in the way of explanation, unless we suppose that the cirrhosis occurred in a liver previously enlarged by simple hypertrophy, or in a large, fatty, or waxy liver. Or we may suppose that the fibrous tissue in a liver, the glandular structure of which is undergoing atrophy, takes on a process of growth,
similar to that in a fibrous tumour; and perhaps the supply of blood which has ceased to contribute to the secretion of the organ, stimulates this abnormal nutrition. I do not see that inflammation of the capsule of Glisson, will at all explain such cases.

I have already said that the idea of pressure on the glandular structures probably arises from the fibrous tissue on the surface, being less prominent than the nodules of gland tissue. When we view the lesion as an atrophy, this appearance is easily accounted for. The fibrous tissue being merely the remains of what occupied a much larger space, it is of necessity less prominent than the parts not atrophied. When the fibrous tissue is abundant, as in the case of Hirsch, the modulated appearance either does not exist or is much less evident. If then we take the knobnailed surface, as an evidence of pressure exercised by the fibrous tissue, we arrive at the strange conclusion, that the pressure is greatest where this tissue is least abundant.

There can be less difficulty about the mode in which cirrhosis of the liver induces dropsy of the peritoneum. It is simply a question of venous obstruction. This is commonly referred to the deposit of...
lymph in the portal canals, by which they are narrowed, so that the ordinary quantity of blood cannot pass through them. This I think is beginning at the wrong end again. When a large portion of the secreting tissue of the liver ceases to exist as much, the blood which supplied it is no longer required, and the organ is then in the same position that a healthy liver would be placed in, if its supply of portal blood was increased to say, double the normal quantity. It is true that the portal canals are narrowed, but this it seems to me is simply because they adapt themselves to the amount of blood passing through them to supply the wants of the gland, which being diminished in size, its accessory parts are lessened in proportion. It matters not whether the enlarged liver is enlarged or diminished in size; as a gland it is atrophied.

Thus the portal vessels being unable to rid themselves of their contents, the entire tissues from which they derive their blood, the peritoneum, intestines etc. are kept in a congested state. Frequently this produces diarrhoea—a transudation or dropsy in fact into the intestines. Effusion into the peritoneum results from the distention of vessels which supply that membrane. While venous
obstruction is the main cause, we must also take into account the morbid state of the blood induced by this disease. The elimination of function of an organ so important as the liver, deranges the entire system of nutrition, so that in the advanced stage, the patient acquires a characteristic cachetic look, and is emaciated to the last degree. 

The blood is further attenuated by the haemorrhage, which so often occurs from the stomach or intestines as a result of the congestion. The influence which haemorrhage exercises struck me forcibly, when reading a case of Dr. Budds, though he does not mention it in that light. The patient in question had symptoms of hepatic disease for two years and a half, when in one day he vomited four quarts of blood, and two days after noticed that his belly was swollen, and in a day or two made his ankles also. This a degree of obstruction which did not produce dying before the haemorrhage, was sufficient to cause it when brought to bear on attenuated blood.

Besides haemorrhage, from the parts directly influenced by portal obstruction, there is very often epistaxis, partly perhaps from the morbid state of the blood, or perhaps from the greater quantity of
venous blood thrown into the general circulation.

There are various other evidences of obstruction. Such is the enlargement of the superficial veins of the abdomen, produced by their carrying on a collateral circulation. The portal blood gets into the systemic veins by anastomoses between branches of the internal iliac and inferior mesenteric veins. Sometimes also by means of adhesions between the liver and diaphragm.

Another evidence of obstructed portal circulation is enlargement of the spleen. This as far as I have seen, admits of few exceptions, and it is difficult to understand how Dr. Budd can say that "the spleen does not seem to be much modified by the existence of cirrhosis." He quotes several cases from Anstal, where it was normal or small; and it sometimes undoubtedly is so. The following case is a well marked example of it:

Elizabeth Saunders, aged 56, was admitted into the Royal Infirmary Ward 18, on the 20th Feb. 1854, labouring under great ascitic distention of the abdomen and oedema of the legs. She suffered from intense dyspnoea, so that her history could not be ascertained, further than
that the nausea and dyspnoea had been present for eight or nine months, and
that during the same period the urine was scanty. On admission this secretion was
found normal. She was evidently sinking and died a few days after.

Sectio Cadaveris. The abdomen contained two gallons of straw coloured
serum. The liver was very small, weighing only 2 lbs 6 oz. and had a sp. gr. of 1054. It
was of a pale colour externally, and presented a well marked knobulated appearance, having
numerous projections from its surface from the size of a pea downwards. The
capsule was of an opaque white colour, and was evidently much thickened. On
section the liver presented a pale tissue, studded with numerous rounded, opaque,
yellowish masses. On microscopic examination the pale part was seen to be composed
of fibrous tissue, while the rounded masses consisted of glandular structure, the cells of
which were generally loaded with fat.

The spleen weighed 20 oz. Its structure appeared healthy but the capsule was
opaque and much thickened.

Kidneys and thoracic organs normal.

Perhaps the thickened capsule would account for the spleen not being enlarged
in this case; as it might. Prevent it
being distended with blood, which usually produces the hypertrophy.

In the case of a man named Mr. Connolly, who died in the Royal Infirmary in Aug. 1853 the spleen was not enlarged although there was great cirrhosis and ascites. The liver weighed 2 lbs 4 oz. The left lobe consisted of two small pieces, weighing together 2 oz., and united by a broad band of atrophied tissue. The remainder of the surface was very nodulated. The spleen was of normal size, soft and diffusible. Though the atrophia of the blood favours the occurrence of dyspnoe in cirrhosis, yet when this is the sole lesion, the blood is not sufficiently altered to produce dyspnoe of other parts independent of obstruction. When the ascites is considerable, the pressure which the fluid exercises on the cava and iliac veins, often causes oedema of the legs, and occasionally to a great degree.

In some cases ascites does not occur in cirrhosis, and then there is usually diarrhoea, as in a case brought before the Pathological Society of Dublin by Professor Greene. Diarrhoea was the cause of death, and there was no dyspnoe whatever. Such a case shows very beautifully that where relief is afforded to the distended vessels by one surface, it is not required by another.
In the cases of Dr. Banks and Dr. Gordon already mentioned, there was no dropsy; though in the former instance there was evidence of obstruction in the great enlargement of the spleen.

The following case seems to show that ascites from cirrhosis of the liver may be quite removed for a time.

Peter McGeaghagan, a discharged soldier aged 35, was admitted into Ward 4 of the Royal Infirmary on the 16th Feb. 1851, when he presented an emaciated and callow appearance, and a jaundiced tint of the conjunctivae. The abdomen was painfully distended, and his breathing was impeded. He had been discharged from the army for ill health five years before, had remittent fever and dysentery in China, and was always intemperate. In the summer of 1849 he had ascites for the first time, and after the failure of the usual remedies he was tapped. At that time he had no cough and the urine was not albuminous. The liver was slightly enlarged, and gradually increased for five weeks or so. After the tapping he gained strength, and had no return of the dropsy until March 1851. This attack lasted for six weeks, when he recovered and remained tolerably well until a fortnight before admission, when the same symptoms
recurred. The superficial veins of the abdomen were distended. There was no oedema of the feet or legs. The peritoneum was slightly oedematous. Urine sp. gr. 1012. Albuminuric. She was tapped the day after admission, and 140 oz. of fluid drawn off. It gave him no relief, and he died a few hours after.

Seetio Cadaveris. There was about a pint of serum in the left pleura. The liver was rather above the normal size. It was pale, firm and tough, showing granulations of hepatic substance very irregularly disposed; with a great deal of homogeneous fibrous substance interposed between them. The granulations were mostly very indistinct, and had not a defined edge. The hepatic cells were nearly normal.

The spleen was much enlarged, weighing 2 lbs. 2 oz. Its surface presented a wrinkled appearance, and the capsule was thickened and very opaque. The splenic pulp was soft. The heart normal.

The kidneys were very large, together weighing 1 lb. 15 oz. There were traces of granular speckles to the naked eye in various parts of them. Under the microscope, many cells and tubes were found much crowded with granular matter.
Ascites sometimes, but much more rarely, results from perifolious enlargement of the liver. Obstruction or obliteration of the trunk of the vena porta, also produces effusion into the peritoneum; as in a case brought before the Pathological Society of Dublin by Dr. Stothes in 1841, where the vena porta and cava were found nearly obliterated by cancerous deposit. There was enlargement of the superficial veins of the abdomen. André Robinet Médical mentions the case of a young man, aged 24, who had ascites, and but very slight oedema of the legs occurring subsequently. Before the spinal column an enormous mass of tubercular glands were found, which forcibly compressed the vena cava and porta.

I have several times seen ascites in connection with malignant disease of the liver or peritoneum. In the former case, it may arise from compression of the vena porta, or some of its branches in the liver, by a cancerous mass. Malignant disease of the peritoneum seems to produce effusion by the irritation and increased vascularity which attends that morbid process.

There is often considerable effusion in the early stage of tubercular peritonitis. It is usually accompanied by pain and
tenderness. The effusion is commonly not very abundant, and it becomes absorbed as the disease advances; the peritoneal cavity being in fact obliterated by adhesions and by the curious netting together of the intestines which occurs in that disease. The effusion in such cases is much more of an inflammatory than of a dropsical character.

Ascites is sometimes produced by the bursting of an ovarian sac into the peritoneum.
Chapter V

Ovarian Dropsy.

Case. — Sarah Jardine, aged 29, is a labourer's wife, and the mother of three children. About November 1852 while her youngest child which she was still nursing was 18 months old, she noticed her abdomen begin to enlarge. The swelling was not observed to be more at one side than the other, and for several months during which it gradually increased, she considered herself pregnant. She had not menstruated from her previous pregnancy. About May she placed herself under medical advice, and the medicines administered she supposed lessened the swelling for a time. Subsequently they lost their effect, and it continued to increase.

I was asked to see her first on the 16th. Sept. 1853. She had then been confined to bed for three weeks; she was much emaciated and her appetite was almost gone. The pulse was about 100 very small and compressible. There was no dyspnoea; she slept little. The urine was somewhat diminished in quantity.
The bowels were lax; she had two or three loose evacuations daily.

The abdomen was much enlarged, very tense and prominent, and was 38 inches in circumference at the umbilicus. It was perfectly dull on percussion in front, from the pubis to the ensiform cartilage, and distinct fluctuation was readily detected. The iliac regions were tympanitic. The dulness was affected by change of position. The umbilicus was prominent and somewhat painful, and the possibility of the tumour evacuating itself at that point at once occurred to me. To favour this I directed that poultices should be constantly applied to it.

On the 20th I saw her again; she was much weaker, and appeared in a precarious state; that although I had determined putting her under a course of treatment with a view of reducing the accumulation of fluid, yet I declined doing so for the present, as I thought it likely she would not survive many days. In the meantime, though not very sanguine as to the result, I ordered the poultices to be continued, and directed her mother, in the event of any discharge occurring to let me know immediately.
On the 24th she had rallied a good deal, the umbilicus was a little more prominent red and painful. The dulness, fluctuation, and tympanitic sounds remained as before. I directed a broad bandage to be applied round the abdomen, over the poutingee, so as to keep up some pressure on the cyst, and that she should take as nourishing a diet as possible. The appetite was still bad. No other treatment was adopted.

On the 28th her mother came and informed me that some discharge had just occurred from the umbilicus. I went to her immediately, and found that three little abscesses, each about the size of a pea had formed in the umbilicus, and two of them had burst. These little collections of matter were so close together that they could all be covered by the thumb. It was evident no communication existed with the cyst. I tried moderate pressure on it, with the view of effecting an opening but without success. I directed the poultice to be continued.

On the day but one after, the mother came again to inform me, that a large quantity of fluid had been discharged. On seeing her I found that on the preceding day while rising to go to stool, a jet of fluid started from one of the little openings in the umbilicus,
She compared it in size to the jet of milk from a cow udder. It continued until it filled a large chamber just the same night a further discharge took place, and a large quantity more came away that morning. The entire quantity that had been discharged up to that time she estimated at ten quarts. A portion of it was kept for my inspection. It was somewhat thick, whitish, very frothy, and evidently contained a quantity of pus. I directed the puncture to be continued, to prevent the aperture closing up. Some discharge took place on the following day.

Oct. 3rd. She felt much better, her appetite was greatly improved, and I endeavoured to keep up her strength by a nutritious diet and stimulants. I found that the circumference of the abdomen, which was 32 inches when I first saw her, was now reduced to 32½. No fluctuation could be detected. A hard tumour was felt midway between the umbilicus and costiform cartilage, nothing could be distinctly made out as to its size or shape.

A day or two after I found her dressed and sitting up. The puncture had been discontinued, and the little apertures appeared to be healed. The discharge had taken place at various times from all...
the three. These apertures had remained small, and had a valvular character, so as to prevent the admission of atmospheric air. A further discharge took place soon after, and the aperture remained open.

I saw her again in November, she was regaining flesh and strength, and was daily occupied with her household duties. There was still a slight discharge, which was now quite purulent.

The last time I had an opportunity of seeing her was in the middle of January between 3 and 4 months after the opening had taken place. She was then so much improved in appearance, that I hardly recognised her. The discharge still continued but was gradually becoming less and less, and was now very trifling indeed. The opening was very small, and had always been of such a character as to prevent the admission of air. I could not detect any tumour in the abdomen, however the opportunity of examining it was not very good. By my directions she had continued to keep up considerable pressure by a bandage. Hardly any other treatment was adopted. Up to that time the catamenia had not returned.
I do not purpose entering into the pathology of ovarian dropsy, which has nothing in common with dropsy in the bladder. This fluid possesses very different characters in different cases, and in different cysts in the same person. There can be little doubt that the case just related was an instance of spontaneous opening, and I think I may add cure of an ovarian cyst, which running its course in less than a year had finally suppurred.

I have not seen the remark made, but it has occurred to me that the probability of spontaneous opening is greatly increased by suppuration, which brings the cyst more or less into the condition of an abscess. The tendency of purulent matter to evacuate itself is well known. Dr. Bennett in the Monthly Journal, Vol. IX p. 508 relates a case of spontaneous cure, where purulent matter was discharged from the bladder. Dr. Montgomery brought a case before the Pathological Society of Dublin, in 1843 where fatty matter, supposed to be the contents of an ovarian cyst, was discharged with the urine; and he mentioned three cases which he had seen, of ovarian cysts being evacuated through the walls of
the abdomen. In two of these, hair se. was discharged through the opening. The presence of such matters would render suppuration likely, and thus account for their expulsion.