

CLINICAL OBSERVATIONS ON THE PATHOLOGY AND TREATMENT OF THE DROPSY WHICH FOLLOWS SCARLET FEVER.

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THE object which the author of this paper has in view, is to contribute to the natural history of an interesting, and sometimes irremediable disease, viz., the Dropsy¹ following Scarlet Fever; and to indicate the most suitable treatment, both for the cure and the prevention of this affection. Its natural history will be illustrated by an historical exposition of the antecedent, concomitant, and subsequent circumstances, of twelve cases carefully observed.

In order to obviate the necessity of much repetition, and to facilitate reference, the cases are numbered. The following table presents the character of each case, in connexion with a few leading points, viz., fever, eruption, desquamation, dropsy, albuminuria, and result; and serves to give a bird's-eye view, of the cases under analysis.

TABLE OF TWELVE CASES OF DROPSY AFTER SCARLET FEVER.

No.	Name	Age.	Fever.	Eruption.	Desquam.	Dropsy.	Albuminuria	Result.
1	Eliza Finch	7	General, inflammatory.	Bright, general.	Extensive.	General.	Much albumen.	Recovered
2	M. Edwards	12	Ditto.	Ditto.	None.	Slight (face only).	Very little.	Ditto.
3	Hen. Finch	4	Ditto.	None, according to mother.	General.	General.	Not sought for.	Ditto.
4	Chas. Fairy	1	Ditto.	None.	None.	Ditto.	Much albumen.	Ditto.
5	John Stacey	4	Ditto.	Bright, general.	General.	General (empyema).	None.	Died.
6	Chs. Childs	4	Ditto.	None.	None.	General.	Ditto.	Ditto.
7	Fred. Cook	6	Ditto.	Bright, general.	Slight (face only).	Ditto.	Considerable.	Recovered
8	Edw. Cook	5	Ditto.	Ditto.	General, persistent.	Ditto.	A trace.	Ditto.
9	Henta. Ford	4	Ditto.	Ditto.	Ditto.	Slight (face only).	None.	Ditto.
10	Geo. Cator	3	Ditto.	Ditto.	Ditto.	Do. (face & feet only).	Very little.	Ditto.
11	M. A. Ford	8	Ditto.	Ditto.	Ditto.	Do. (face only).	Not sought for.	Ditto.
12	C. Milbourn	6	Ditto.	Ditto.	None.	Do. (face & feet only).	None.	Ditto.

These twelve examples of Dropsy following Scarlet Fever, form only a very inconsiderable portion of the cases which have occurred in the author's practice, during the last fifteen years; and they are selected for review here, in preference to others, because they were narrowly

¹ For convenience, the more general term Dropsy is here made use of, to embrace every form of watery effusion into the cellular tissue, and shut sacs of the body. The words Anasarca and Oedema are used in their strictly limited sense.

watched, and laboriously recorded, as materials for future comparison and analysis. They came under the care of the writer in his late capacity of physician to the Northern Dispensary, and embrace all the cases of the disease which fell to his charge from June 1844 to January 1845, both months included; during which period the parent disease, scarlet fever, prevailed in the metropolis to a very great extent.

Instead of giving a detailed and separate history of each case, the writer has thought it better to treat each point of interest in connexion with the whole group of cases. In this way, the facts of each case will not only be elicited, but presented in a prominent manner, and after the numerical method. The reader will thus be enabled to form a ready decision as to the comparative frequency of certain symptoms and occurrences. Considerable labour has been undergone in noting down the facts at the time, and in subsequently arranging them in a statistical form. Some omissions have unavoidably occurred; and, in a few instances, some minor facts, not likely to be mistaken, in connexion with the history of the cases previously to their coming under the eye of the writer, have been given on the testimony of parents, and may be relied on as, on the whole, worthy of credence.¹

The *previous health* had been sound in eight of the patients; and delicate in four, only one of whom (No. 3), suffered a severe attack of anasarca. The *habit of body* in three of the cases, was decidedly strumous. Two of these (Nos. 1 and 3), were brother and sister, and had dropsy in a severe form. The *comforts of life* were enjoyed to a large extent by ten of the patients, considering their position in society. They had comfortable warm homes, sufficient and wholesome food, and had been carefully attended to by their parents. Miserable destitution was the lot of one child (No. 6), who had general anasarca, and who subsequently died. One (No. 4), who had general dropsy, with bloody urine, was the subject of maternal neglect and recklessness.

The ages of the twelve patients are shown in the following table.

Years	1	2	3	4	5	6	7	8	9	10	11	12
Number of Cases	1	0	1	4	1	2	1	1	0	0	0	1

Relationship between the patients.—Six of the patients were brothers and sisters, belonging to three different families: those in each of the three families suffered much in the same manner, and to the same extent.

Sex.—Eight of the twelve patients were boys: four were girls, of whom only one suffered dropsy to a great extent.

Season.—The greater number of cases occurred in summer and autumn. Three occurred at the beginning of winter. One of the fatal cases occurred in August, the other in October.

PERIOD OF ERUPTION AND DESQUAMATION. — The *eruptive fever*

¹ It was the intention of the author to have presented the following facts to the notice of the profession before this time; but circumstances have prevented this from being accomplished, and they are now reduced to the present form, at a period when his avocations afford him but little leisure. The plan and limits of this paper do not admit of references to the important contributions of other authors on the same subject: but as the author claims no originality, it is hoped that their omission will not prove the ground of offence to any one.

was smart and moderately inflammatory in all the patients. The eruption was not observed in three cases (Nos. 3, 4, and 6), of which all were remarkable for their severity, and one for its fatal termination. In case No. 4, the writer observed general and persistent desquamation; the evidence respecting the non-appearance of the eruption was derived from the mother, an intelligent woman. In nine cases, the eruption came out in the usual manner, was bright and distinct, and general over the surface of the body: it remained out the usual time, and declined in the ordinary manner.

The *fauces* were affected in eleven cases; in the twelfth, it was doubtful whether or not they were affected. In the eleven cases, there was considerable inflammation, accompanied by swelling; but in none of them did ulceration or sloughing occur.

The *lymphatic glands* of the neck were considerably swollen in three moderate cases of dropsy; and much swollen, with an abscess as large as a hen's egg, in a severe case. In two moderate cases they were healthy. No mention of their condition is made in six cases.

The *mucous membranes* were in a state of considerable irritation in ten cases. In two very moderate cases, they are reported to have been healthy.

The *quantity of urine* passed during the eruptive fever, was ascertained, in almost every case, to be decidedly scanty. In three cases, (Nos. 7, 8, and 10), the subjects of which were under the writer's eye from the period of the first invasion of the parent disease, the urine was scanty during the eruptive fever; and, immediately before the period of effusion, it decreased remarkably in quantity, almost to total suppression.

Desquamation of the cuticle did not take place in four cases, viz., Nos. 2, 4, 6, and 12. In two of these cases there had been no eruption; in the other two, it had come out freely. In all the other cases desquamation occurred. It was confined to the face in No. 7, a case of general anasarca; and was general in the other cases, of which Nos. 3 and 5 were remarkable for the severity of the dropsical effusion. The integuments felt rough and hard, and communicated to the touch a sensation of resistance, like parchment. The cuticle came away in large scales, rather thick, and of a darkish colour. The desquamation occurred from time to time, during a period of two or three weeks; this was particularly observed in Nos. 9, 10 and 11, all cases of very slight dropsy; and in No. 8, a case of general dropsy of the cellular tissue. In No. 3, a case of non-eruption, the author observed desquamation of the cuticle. It is very probable, that, in this case, an eruption had occurred; but that it had been so slight, and short in duration, as to have escaped the observation of the mother. Yet, as no eruption was observed, the case is put down as one of non-eruption.

Relative dates of Desquamation and Dropsy.—In case No. 1, desquamation and dropsy were found at the first examination, and were concurrent throughout. In No. 3, dropsy began five days before desquamation. In No. 5, desquamation took place before dropsy, and had ceased before death. In No. 7, desquamation began a few days before dropsy, as also in Nos. 9 and 11. In No. 8, desquamation began eight days before dropsy, and was concurrent throughout with dropsy. In

No. 10, desquamation commenced nine days before dropsy, and accompanied it throughout.

State of the blood.—The blood was found to have a buffy coat in No. 7, a case complicated with pericarditis; the specific gravity of the serum was 1025. In No. 10, the specific gravity of the serum was 1025 on the thirteenth day after the commencement of the disease; a moderate degree of œdema of the face and feet appearing at this time. There was, in this case, very little albumen in the urine, but extensive and persistent desquamation.

Complications during the eruption.—In No. 7, pericarditis supervened, and arthritic pains were experienced in the wrists and ankles; the same affection of the joints occurred in No. 8.

The *condition of the vital powers* of each case, when first seen, is given in the following list.

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|---|---|
| 1. Considerable power; circulation excited. | 6. Exhausted; pulse 120. |
| 2. Considerable power; circulation not rapid. | 7. Some power; pulse 80. |
| 3. Some power; circulation rapid. | 8. Some power; circulation rapid. |
| 4. Some power; pulse 120. | 9. Considerable power; circulation quiet. |
| 5. Exhausted; pulse 140. | 10. Some power; pulse 140. |
| | 11. Considerable power; pulse 100. |
| | 12. Considerable power; pulse 120. |

PERIOD OF DROPSICAL EFFUSION.—The dates of the appearance of the Dropsical Effusion, and other particulars, will be found in the following table. (*See next page.*)

The *blood* was cupped and buffed in case No. 1, the only one in which blood-letting was employed during dropsy. The specific gravity of the serum was 1025.

Complications during Dropsy.—In No. 1, there was partial coma, with intermittent pulse. In No. 4, hæmaturia occurred. In No. 5, there occurred pericarditis, pleuritis, and inflammation of the tunica vaginalis of the left testis, with sero-purulent effusion in the pericardium, right pleura, and tunica vaginalis. In No. 7, there was excitement of the heart's action, after symptoms of pericarditis, followed by very small and sometimes imperceptible pulse at the right wrist, with sensation of faintness.¹ In case No. 8, syncope occurred, with pulse weaker at the right wrist than at the left. The symptoms in No. 12 were complicated with arthritis.

Results.—Complete recovery took place in ten cases. Death occurred in two only, viz., Nos. 5 and 6, both of which were much exhausted when first seen by the writer.

Examination of the Body after Death was made in the two fatal cases. In the case No. 5, no fluid was found in the cellular tissue, the whole effusion having been removed before death. A few loose white fibrinous bands connected the pleura costalis with the pleura pulmonalis, on the left side. The cavity of the right pleura was filled with

¹ The difference in the pulse at the two wrists, in this and the following case, was well marked. The same circumstance has been noted by the author in other children, whose powers of life had been considerably reduced under scarlet fever. Perhaps the smaller development of the pulse in the right wrist may be due to its somewhat greater distance from the enfeebled heart, or to the additional break in the current of blood, produced by the subclavian artery of the right side coming off from the innominate.

TABULAR VIEW OF THE APPEARANCE OF DROPSY, ALBUMINURIA, ETC.

Case.	Date of appearance from commencement of disease.	Date of appearance when first seen by the author. (1)	Duration.	Seat.	Average quantity of urine during rise and height of dropsy.	Colour of urine.	Sp. gr. of urine.	Albuminuria. (2)	Date of first discovery of albumen.	Duration of albuminuria.
1	22nd day.	Early date.	8 weeks.	Surface of body generally.	Scanty.	High at first; then smoke-coloured; finally pale.	At first, 1026, without albumen; then 1016 with albumen; when albumen disappeared, 1017.	Much.	Several days after appearance of dropsy.	Accompanied dropsy throughout, and disappeared with it.
2	28th day.	7th day.	A few days.	Face only.	Natural.	At first, high coloured; then light.	At first, 1010.	Very little.	Discovered at first examination seven days after appearance of dropsy.	Not found after first examination.
3	16th day.	10th day.	3 weeks.	Surface of body generally.	8 ounces per diem.	Dark, mud-coloured.	At first, 1010.	Not sought for.	Ditto.	Accompanied dropsy throughout, and disappeared at same time with it.
4	14th day.	7th day.	4 weeks.	Ditto.	2 ounces per diem.	At first, smoke-coloured; then blood-red; finally of light amber-colour.	1020, when blood-red.	Much.		
5	Uncertain.	2nd month.	9 weeks.	Surface generally; right pleura; pericardium; left tunica vaginalis.	Scanty.	Deep amber-colour.	1080.	None found.		
6	11th day.	10th day.	3 weeks.	Surface generally; the pleura; pericardium, and abdominal cavity.	A few ounces daily.	Not recorded.	1099.	None.		

7	21st day.	2nd day.	2 weeks.	Surface generally.	Very scanty.	At first, smoke coloured; then almost colourless.	1028 at first, with albumen; then 1014, as smoke colour disappeared, and quantity increased; when urine became copious, 1005.	Considerable. Two or three drops of nitric acid produced a white cloud, which slowly sank a short way, and then disappeared. A larger quantity of acid produced a well-defined precipitate of albumen.	Two days after appearance of dropsy.	Accompanied dropsy throughout, and was lost after three days of dropsy.
8	19th day.	3rd day.	8 weeks.	Ditto.	Very scanty; scarcely any.	Almost colourless, eleven days after appearance of dropsy.	1010 at first examination, when copious after almost total suppression, but not albuminous; then 1005, when copious, and almost colourless.	A trace.	Fifteen days after appearance of dropsy.	Transitory.
9	17th day.	1st day.	A few days.	Face only.	Usual quantity.	Not recorded.	1020.	None.	A few days after appearance of dropsy in face	Observed only once.
10	14th day.	Ditto.	Ditto.	Face and feet.	Scanty.	Light amber colour.	1010.	Very little.		
11	23rd day.	Ditto.	Ditto.	Face only.	Not examined.	Not recorded.	Not recorded.	Not sought for.		
12	6th week.	2nd day.	Ditto.	Face and feet.	10 ounces per diem.	High coloured; like lithic acid urine.	1028.	None.		

* Albumen was sought for, but not found, in the urine of patients Nos. 7, 8, 9, 10 and 11, had been under the author's care during the primary eruptive fever.

† The cases numbered 2, 7, 8, 9, 10 and 11, had been under the author's care during the primary eruptive fever, and before the appearance of effusion. The tests employed were heat and nitric acid.

sero-purulent fluid, of a green colour. The right lung was hepatized and contracted, lying alongside the vertebral column. The pericardium contained about six ounces of sero-purulent fluid. The free portion of the pericardium was of a pink-rose colour, and was covered throughout—as was also the portion investing the heart and roots of the blood-vessels—with much coagulated lymph, giving them a honeycomb appearance. Loose fibrinous bands also connected the two layers of the pericardium. The peritoneal cavity contained four ounces of sero-purulent fluid; and bands of lymph were found on the peritoneum. The kidneys were large and firm, weighing each, upwards of 2 oz.: the cortical portion was somewhat pallid. The cavity of the left tunica vaginalis testis was obliterated, except at one part, where two drachms of sero-purulent fluid were confined.¹

In case No. 6, the cellular tissue of the surface of the body was extensively infiltrated with serous fluid. An ounce of fluid was found effused in each pleural cavity, and four ounces in the pericardium. The pleuræ and pericardium appeared natural in other respects. The heart was small and flaccid, also pale and blanched, as the healthy heart would be if digested in water for some days. The peritoneum contained eight ounces of limpid serous fluid, the analysis of which will be found below. The kidneys were firm and gorged with blood; and the cortical part was of a deep brick-red colour. The weight of each was one and a half ounces. The bladder contained a few ounces of pale, clear, neutral urine.

ANALYSIS OF URINE TAKEN FROM BLADDER AFTER DEATH. ²		ANALYSIS OF SEROUS FLUID FROM ABDOMINAL CAVITY.	
Water	978 00	Water	96·6
Urea	60·92	Albumen	2·2
Hippuric acid, animal extractive, and vesical mucus	1·74	Fatty and extractive matter	·1
Alkaline salts	7·85	Salts, chiefly alkaline	·5
Phosphates and silica	1·39	Loss	·6
Loss	·10		
	1000·00		100·0

The urine was examined after recovery, in the following cases, without detecting albumen; in No. 1, at the end of five months; in No. 2, at three months; in No. 3, at five months; in No. 7, at the end of ten months; in No. 9, at three months; and in No. 10, at five months. No examination was made in the other cases.

Varieties of anasarca.—Four varieties of anasarca were presented by the preceding cases; the presence of albuminuria, and desquamation of the cuticle, being taken as the grounds of classification.

1. Anasarca with albuminuria and desquamation; as in cases 1, 7, 8, and 10.
2. Anasarca with albuminuria, and without desquamation; as in cases 2 and 4.
3. Anasarca without albuminuria, but with desquamation; as in cases 5 and 9.

¹ Some of the particulars of this case are given in a paper, by the author, on Pericarditis following Scarlet Fever, published in the Medical Gazette, 1845.

² These analyses were made by a professional friend, on whose accuracy the author has every reason to depend.

4. Anasarca without albuminuria or desquamation; as in cases 6 and 12.

In the third and fourth varieties, albumen may have been present in the urine at an early period of the disease, in those cases which were only seen at an advanced stage; for there is evidence to show that the kidney is capable of recovering itself in a very short time, and of again secreting non-albuminous urine.

Another division of the cases of dropsical effusion may be made, into *sthenic* and *asthenic*, by taking as the basis, the state of the powers of the system. Considerable power existed in all the cases, excepting 5 and 6; these displayed great exhaustion from the time of their first coming under notice. But there is manifestly an objection to this classification, at least with respect to the above cases, which has been a favourite one with some writers. Those cases which displayed exhaustion were, when first noted, in a late stage of the disease; and again, some of the others, which indicated considerable power at the commencement, were, soon after, signalized by great debility, faintness, and enfeebled action of the heart. This classification, however, may be very useful in a therapeutical point of view.

Another division of the foregoing cases may be justified, viz., into those of *general and persistent effusion*, and into those in which it was of a *limited and transitory* character; the former being dependent on serious obstruction of the kidney, or skin, or both; the latter apparently arising from some slight excited or inflammatory action, or only very evanescent obstruction, of the kidney.

GENERAL REMARKS ON THE DROPSY OF SCARLET FEVER.

1. ITS NATURE.—The dropsy following scarlet fever is ushered in by certain symptoms indicative of excited action, such as heat of skin, furred tongue, thirst, quick pulse, and reduced secretions. In this respect it resembles the inflammatory dropsy which arises from obstructive disease of the kidney under ordinary circumstances, and differs widely from the passive dropsy originating from venous obstruction. The inflammatory symptoms in the dropsy of scarlet fever, are perhaps owing, in part, to the repletion and distension occurring primarily in the arterial system, which is more active, and more engaged in the functions of nutrition and secretion, than the venous. The fluid of the dropsy of scarlet fever, as well as that of inflammatory dropsy, is the result of exhalation or secretion; while that of chronic dropsy, from venous obstruction, or from debility, is the product of mechanical exudation or of non-absorption. Inflammatory dropsy has sometimes been styled dropsy of the left side of the heart, while chronic dropsy, from venous obstruction at the heart, has been styled dropsy of the right side. More suitable titles would perhaps be arterial dropsy for the former, and venous for the latter.

The effusion in this disease takes place first in the cellular tissue, because the arterial capillaries find there little resistance to the relief of their over-distension. The serous membranes next afford an outlet; but, from their liability to inflammation, the effusion is frequently mixed with coagulable lymph, or is sero-purulent.

Pathological causes.—The dropsy following scarlet fever does not

appear to have any essential connexion with the presence or absence of *desquamation of the cuticle*. This is proved by the occurrence of anasarca in cases 2, 4, 6, and 12, in all of which no desquamation whatever took place.

Albuminuria, likewise, is not essential to the production of the dropsy. This is proved by the occurrence of anasarca in cases 9 and 12, in which, the most careful examination failed to detect any albumen in the urine. Another proof may be derived from a reference to the relative dates of the appearance of albuminuria and of anasarca, in those cases in which albumen was discovered in the urine. In case No. 1, albumen was not discovered till several days after the appearance of anasarca; and in case No. 8, only a trace of albumen was detected, on two occasions, fifteen days after the supervention of dropsy, although repeated and careful examinations were made for the detection of that principle, from the time of the decline of the eruption, till the final recovery of the patient.

In all the cases, excepting three, there is undoubted evidence of *partial suppression of the secretion of urine*, before the appearance of anasarca, or some time after its establishment. In two of the three cases, viz., Nos. 2 and 9, the urine was of the usual quantity during the anasarca; in the third, viz., No. 11, no record of the quantity was preserved. Thus it appears, that in nine out of eleven cases, of which a memorandum had been preserved, the urine was secreted in reduced quantity; or, in other words, was retained in the circulation. The retention in the circulation of the urine which should have been excreted by the kidneys, seems to have been an essential cause of the dropsy, in each of the nine cases above referred to; in all of these, there was considerable reduction of the secretion of urine. In the two fatal cases, the quantity of urine passed during the twenty-four hours did not exceed, respectively, four ounces, and "a few ounces." In the two examples of anasarca in which the urinary secretion was of the natural quantity, and in these only, the effusion was confined to the face, and was merely ephemeral.

In order to determine whether the detention of urine in the system, be really an essential antecedent of dropsical effusions, it would be desirable to ascertain the quantity of the secretion prior to the appearance of the effusion, and not merely after its manifestation. To effect this object, considerable trouble is necessary; for it would be indispensable to examine the urine regularly for some weeks after the appearance of the eruption. It is not till the expiration of this time, that anasarca usually manifests itself. Again, as we have no means of foretelling what cases will be followed by anasarca, numerous observations, in all cases, would be unavoidably necessary. The writer is enabled to afford some evidence here,—having carefully noted the condition of the urine for some time, in two cases of scarlatina. After the cessation of the fever the urine was copious; but it then suddenly became reduced in quantity. In one case (No. 7), it assumed a muddy or smoke colour; and anasarca then appeared. In another case (No. 8), the urine was suppressed for two days; anasarca then occurred. There is some reason, therefore, to suppose, that the retention in the system of urine, which should have been voided by the kidneys, is an essential antecedent of scarlatina; at least in those cases in which the effusion becomes considerable.

It may also be rationally conjectured, that, even in cases where there is not considerable suppression of urine, a certain amount of retention of water may take place, and prove one of the necessary antecedents of the effusion. It is not unlikely, that even a small quantity of water not missed in the urine, if checked at the kidneys and retained in the circulation, when the system, and especially the skin, is unaccommodating, and unable to furnish a vicarious discharge, may give rise to partial anasarca.

This retention in the circulation of fluid, which should have been voided by the kidneys, is probably the result of disease of those organs. The kidneys become the seat of disease, at an early part of the progress of scarlet fever; sometimes within the first few days. This is proved by a very great reduction in the amount of secretion, not unfrequently observed at this period. In several cases of anasarca, it was discovered that the quantity of urine had been scanty, or very scanty, during the eruption. Besides, in some cases of scarlatina which were not followed by anasarca, the quantity of urine was reduced to a mere trifle, in the first few days of the disease. In one example, that of a girl two and a half years old, the quantity excreted did not exceed one ounce and a half *per diem*.

The *condition of the secretion* affords another proof of the presence of disease of the kidney, at a very early period of the eruptive disease, and long before anasarca usually appears. The colour has been found to be abnormal; the secretion in some instances being of a reddish tinge; the natural colour being exaggerated in others; while again, in a few cases, it has been observed almost colourless. More rarely it has a green tinge. The odour has been unnatural; in one case, it was sweet, like that of a sickly child's breath. Albumen was discovered on the third day of illness, in a case which terminated fatally on the fifth day. The specific gravity has been abnormal, at an early period: in some cases 1005, in others as high as 1030. It has been observed at first to rise, and then to fall, and to rise again on the appearance of dropsy. Lithate of ammonia has been abundantly deposited in many cases; and, in several specimens, nitric acid has precipitated large quantities of lithic acid. These conditions are doubtless in some measure connected with the state of the blood and digestion; yet they may reasonably be taken as evidences also of renal disease.

The early implication of the kidney in scarlet fever is indicated by the early appearance of certain symptoms; viz., urgent desire to empty the bladder, pain in the region of that organ, and other symptoms, which, it is reasonable to suppose, arise from retention in the circulation, through defective action of the kidneys, of the urinary constituents. Arthritic pains are very often noticed. The *low specific gravity* of the serum of the blood, viz., 1025, in two examples of scarlet fever, may be held to countenance the idea that the kidney is early implicated.

Examination after death has likewise contributed its evidence, to show that the kidney is liable to be early implicated in scarlet fever. The writer unfortunately has not had many opportunities of seeing *post mortem* examinations in cases of scarlet fever, in an early stage of the disease. One patient, however, died on the fifth day of the disease and before the eruption had declined. Death was caused by head affec-

tion, occurring suddenly with convulsions. The body was examined. The left kidney was larger than the right. It was congested to a great extent. When incised, the colour was found deeper than natural, and much blood poured out from every part of the cut surfaces. The papillæ were exaggerated. The right kidney was normal, and this opportunely afforded the means of contrasting it with the diseased organ.

The affection of the kidney in the early stage of the disease appears to be part and parcel of the malady. It is to the kidney what the eruption is to the skin, or what the diffused inflammation and the white patchy exudations are to the fauces. The kidney, in scarlet fever, is destined to suffer a share of this zymotic disease, as well as other parts of the body. The virus of the disease seems to seek the kidney as well as the skin. It is the very nature of the disease for the kidney to suffer. The nature of the affection of the kidney at the early stage of the disease is analogous to that of the skin. It is the peculiar action of the disease. It is probably, in most cases, short of inflammation, but marked as in the case of the skin, with active congestion, increase of the supply of blood, and of general vitality.

When the implication of the kidney is great and the congestion extensive, we have a reduction of the quantity of urine; it also becomes altered, is rarely pale, and of low specific gravity; at other times, high coloured, turbid, and of high specific gravity.

After a time, the congestion remaining, and certain conditions existing favourable to this result, albumen is secreted with the urine, or the red globules of the blood may likewise pass away. The kidney becomes unable to eliminate urea, and that poisonous principle is retained in the blood. The affection of the kidney may decline before anasarca takes place, before the secretion of the kidney is materially reduced, or before albumen or blood appear in the urine.

The kidney, there is reason to believe, may escape implication altogether, in some cases, in the same way that the skin is occasionally not visited by the eruption, or that the fauces remain healthy.

It is well known that, in some epidemics, there exists a greater liability to the affection of the kidney, than in others; and this will explain the more frequent occurrence of dropsy in one visitation than in another.

The excessive formation of epithelium appears to be one of the modes, by which the affection of the kidney causes a suppression of the urine.

It appears, that in many cases, the kidney regains its health after the subsidence of the primary fever; but after a period of repose more or less prolonged, that organ rises into morbid activity again, becomes now the seat of still more active congestion, perhaps of inflammation, and gives rise to a scanty, an albuminous, or a sanguineous secretion, and the excessive formation of epithelium scales, a process analogous to the desquamation at the surface, and thus produces dropsy at a late period. Such appears to be the case, if we may judge from the progress of the symptoms and the examination of the secreted fluid.

This renewed activity, is analogous to the renewed activity which is generally observed in the skin. After the decline of the eruption,

the skin becomes moist, or slightly scurfy, and after having regained its apparently healthy condition, it has frequently, in the experience of the writer, become the seat of great activity, of heat, of dryness, of extraordinary desquamation, repeated again and again, over two, and three, and even four weeks. This excessive action both of the kidney and the skin, is similar to what occurs in some other diseases, and may be regarded as analogous, in some respects, to the glandular swellings after fever, and the inflammatory symptoms after the collapse of cholera.

When the suppressive affection of the kidney is considerable, and does not give way very soon, the circulation will relieve itself, if death do not occur in the meantime, either by throwing some of its superfluous water into the cellular structure, or into the serous cavities, or omit to take up again the normal secretions of those parts,—and thus give rise to dropsy in one or other of its shapes. When the affection is slight, a balance may be maintained for a time, by vicarious exhalation at an open surface, by the skin, the mucous membrane of the bowels, or by the lungs; and dropsy may be thus avoided.

When the skin is blocked up at the same time, in consequence of extensive desquamation, the chances of a balance being maintained without the occurrence of dropsy are materially reduced; and this is one of the reasons that anasarca has been noticed in a large proportion of cases marked by extensive desquamation.

Desquamation, when extensive and repeated, favours the induction of dropsy in two ways. By obstructing the perspiration and exhalation of the skin, a more than usually large quantity of fluid is thrown upon the kidney for elimination, and the kidney has thus its chances of suffering disease materially increased, or of having a slightly obstructive disease raised into a highly obstructive one. Again, no accommodation, however temporary, is given by the skin, to the suffering kidney. The superfluous water of the circulation obtaining no outlet, either at the interior or the exterior of the body, dropsy is more likely to take place. This appears to be the relation of desquamation to anasarca.

The presence of albumen in the urine, as before remarked, does not appear to be an essential antecedent of anasarca. In some cases of dropsy, it was not to be found at all. Albuminuria is only a consequence, among others, of that condition of the kidney which gives rise to the suppression of the urine, the essential cause, or one of the essential causes, of general dropsy. Albuminuria is sometimes found when the dropsy is very slight; and it is not to be recognized in some cases of great severity. It is not always a good criterion of the extent of the disease of the kidney; and it may not show itself until the disease is in its latter stages, or actually upon the wane.

Two cases of anasarca of the face occurred, in which the urine was secreted in the usual quantity. It is necessary, therefore, to look for another cause of the affection, besides the suppression of the urine, or to regard the œdema as different from the anasarca in the other cases. The œdema was coexistent with slight general inflammatory symptoms; in one case there had been slight desquamation of the face, and in the other, extensive and repeated desquamation of the whole surface. In the first case, there could be no retention of an aqueous secretion to any extent; but there had been inflammatory symptoms. In this case,

the cause of the œdema was, probably, a slight inflammatory action of the subcutaneous cellular tissue. In the second case, the cause was, probably, the same, induced or aggravated by the suppressed exhalation by the skin. It is possible that obstructive disease of the kidney might have been present in these cases, but to an extent so slight as not to be appreciable on a cursory examination, yet sufficient to induce partial œdema.

The disease of the kidney occurring after scarlet fever, and connected with anasarca, has been thought by some observers to form the foundation of organic alteration, and to lead to those changes which are associated under the head of Bright's kidney. There is some reason to believe that this opinion is well founded; but fresh observations are required to settle the point in a satisfactory manner. On the other hand, in most examples of anasarca, the kidney appears to regain its healthy condition, if we may judge by the perfect health of the patient for years after, and from the natural condition of the urine. The urine of six of the twelve patients was examined some months after recovery. No albumen was found in any one specimen; and no other pathological character was discovered.

In the experience of the author, the examples of the eruptive disease which are most liable to be followed by anasarca, are marked by smart inflammatory fever, not very violent, and general vivid persistent eruption, or repressed eruption, moderate inflammation of the fauces, persistent desquamation, and scanty, turbid, high-coloured urine, sometimes of a reddish tinge. It is in somewhat analogous and moderate cases of fever, that Peyer's glands are most frequently implicated.

The examples of the disease least liable to be followed by dropsy, are those in which the type of the fever is asthenic, and in which local disease of serious import manifests itself in some part distinct from the kidney. In severe cases of sloughing of the fauces, or of great swelling in the parotid and submaxillary glands, the writer has never found anasarca to follow. Prostrated powers of life, typhoid symptoms, and draining or exhausting diseases in other parts, seem to be unfavourable to the developement of serious implication of the kidney. The very mitigated cases of scarlet fever, in the experience of the writer, have been altogether exempt from dropsy. The only member of the family of the patients Cook, who had scarlet fever in a very mitigated form, so as to be scarcely made out, was the only one who did not suffer from dropsy; and the same observation is applicable to the family of the patients Ford.

The general condition of the system which seems to afford the greatest liability to dropsy, is that of considerable power. A constipated condition of bowels appears to favour the advent of the disease.

PHYSIOLOGICAL CAUSES.—Members of the same family display a liability to be similarly affected, in many diseases. It is so in respect to disease of the kidney after scarlet fever. Six of the twelve patients were brothers and sisters in three different families. Calculations have proved to the writer that a child, labouring under scarlet fever, who has a brother or sister affected with anasarca depending on disease of the kidney, has double the chance of being affected with the same evil, that falls to

the lot of another whose brothers and sisters have not suffered in that way from scarlet fever. The female constitution, in the experience of the writer, has not shown any of that greater affinity for the disease, over the male, advanced by some writers.

The comparative activity of the kidney at the early periods of life, serves to increase the risk of disease of that organ in children. The quantity of urea secreted by children is proportionally much higher than that of persons advanced in years. A child of eight years secretes nearly twice as much urea as a man of eighty-four years. This greater amount of labour on the part of the kidney, not only enhances the risk of disease, but makes that disease, when established, greatly more dangerous.

PHYSICAL CAUSES.—The external circumstances which have most favoured the development of anasarca, have been cold and sudden alterations of temperature, particularly from warmth to cold. It is in the evidence of many writers, that this has been a common prelude to the disease; and to accept it as an auxiliary or occasional cause, is consonant with sound pathological principles.

Yet it appears that cold has been too generally and too absolutely put down as the cause of anasarca. It has been already shown, that there is some evidence to prove, that the kidney, by a law of the disease, is liable to be early affected, and that the affection is analogous to that of the skin. If such be the case, it is not fair to regard cold as an absolute cause. Doubtless it may, and does, favour and aggravate the disease, but it can no more be said to be the cause of the renal implication, than cold can be said to be the cause of the affection of the fauces, because it may, and does, favour and aggravate it; or heat can be said to be the cause of the eruption of the skin, which it is known to promote and increase. Under the greatest care, and under the best management, with a strict regard to the scrupulous exclusion of cold, anasarca has made its appearance, in the experience of the writer; and he is desirous of having it understood, that this disease is, as it were, in some cases, a natural consequence of scarlet fever, and cannot be prevented in every instance, by the best possible known management:—it should be understood, that the appearance of anasarca is not necessarily owing to the mismanagement of the medical attendant or the negligence of parents and nurses, but is rather to be regarded as the result of a natural tendency of the eruptive disease, of course more or less under the influence of good management.

Insufficient dieting and impure air, if they cannot be regarded as among the exciting causes of the dropsy of scarlet fever, have materially added to its danger, and rendered the hapless sufferers from them less able to contend with the disease. By lowering the general vitality, these evils have shortened the opportunity of overcoming the tendency of the disease to death by syncope, and reduced the chance of the kidney regaining its healthy action.

That condition of things which the author has been in the habit of grouping together, under the title of General Sanitary Condition, has decidedly influenced the manifestation of the dropsy of scarlet fever. Where that has been undoubtedly low, there the proportion of cases has been unequivocally greater, than when the General Sanitary Con-

dition has been high. And it is for this reason, in part, that the lower classes of the population suffer from this disease to a greater extent than the upper.

THE TREATMENT OF DROPSY.—A careful observation of the cases of anasarca, which have been given above, has led the writer to the conclusion, that such cases will seldom bear general blood-letting and very lowering practice. In this respect, these cases differ very much from the examples of the same disease, which he frequently met with amongst the children of the country people of Haddingtonshire, when he practised in that quarter. There the disease was successfully treated by moderate general blood-letting and other lowering practice. However, general blood-letting is justifiable, where the powers of life are great, and serious local inflammation is threatened. For the cases of partial œdema, a smart purgative, with confinement to bed, will in general suffice.

For those cases of general dropsy, in which the powers of life are considerable, in which the circulation is excited, and the kidneys are obviously congested, the perspiration of the skin is to be early secured, the bowels are to be purged, and blood is to be taken from the loins by leeches or cupping. The value of free evacuations from the alimentary canal, was well illustrated in one severe case of general dropsy. Severe vomiting and purging occurred, and though the urinary secretion did not increase but remained exceedingly scanty, the anasarca visibly declined.

When the disease of the kidney remains obstinate, and the strength will permit, a seton in the loins will form a most useful drain, and successfully relieve the overloaded and overpowered kidney. The permanent fomentation, of flannel wrung out of hot water, the large bran poultice, or what is as useful and more readily procured,—the wash-leather saturated with hot water, or the recent valuable invention, the spongio-piline, applied for some hours round the body at the loins, will prove very useful. These applications, with the exception of the spongio-piline, must be covered with plenty of dry warm flannel to prevent their becoming cool.

The examples of the disease, which are associated with defective general power, whether from original defect of constitution, from privation, or from the exhausting effects of the eruptive disease, demand supporting practice. Whilst the secretions are moderately encouraged, it will, in many cases, be necessary to give wine, vegetable tonics, and iron. The potassio-tartrate and the iodide are the best preparations of iron. The spirits of nitrous æther prove serviceable. Special symptoms will demand special treatment. A nourishing diet is indispensable. In the treatment of some of the cases related in this paper, vegetable tonics were first used, then followed iron, and this plan proved highly serviceable. It will be prudent practice not to be very heroic in the treatment of the disease,—not to tax the powers of life more than appears absolutely necessary for the present emergency,—for cases of anasarca, which have commenced with a display of considerable strength on the part of the patient, have been, in the course of a few short days, marked with great exhaustion, weakness of the heart, almost imperceptible pulse, and syncope.

The employment of diuretics demands discretion. They were not found to be very useful in some of the twelve cases. The secretion has remained almost suppressed, notwithstanding their employment, and again the urine has been remarked to become abundant, pale, and almost colourless, in some instances when they have not been exhibited.

The abatement of the kidney-disease and the return of the natural condition of the vital powers of that organ, are the only true and safe basis on which to rest our hopes of permanent relief, and it does not appear that some of the medicines called diuretics, are pre-eminently calculated to effect these objects. On the contrary, the writer has reason to believe, that some of the more stimulating are calculated, in cases of active congestion, to do much harm, by aggravating the local malady, and he has seen evil to result from their employment. When administered, the milder diuretics should be selected, and their effects carefully noted. When the renal affection has somewhat subsided, the author has found most advantage to proceed from the use of the spirits of nitre, the iodide of potassium, and the alkaline diuretics. In all cases it will be safe and judicious practice to commence with small doses.

Scarifications of the integument, when the cellular tissue remains much infiltrated with serous fluid, will often give relief. They will reduce both the water and the poisonous materials denied an outlet by the kidney. The risk of sloughing will be rendered trifling by the application of a mild ointment to the neighbouring integument, for its defence against the oozing discharge, and against wet or harsh dressings: wash-leather will imbibe the liquid as effectually as linen, and will be less unkind to the sensitive skin. This practice will give relief in the meantime, and afford time for the abatement of the renal disease.

The diet, during the dropsy of scarlet fever, should be carefully regulated. All unnecessary consumption of azotized food should be avoided. The obstruction of the chief emunctory for azotized materials, obviously indicates this precaution.

PREVENTION OF DROPSY.¹—The occurrence of anasarca will be least liable to occur where means are adopted in an efficient manner to promote the full development of the eruption on the surface; to secure a perspiring condition of the skin during the eruption, and after the decline; to prevent congestion of the kidney; and to secure the free flow of the secretions of the liver and alimentary canal.

The full development of the eruption of the skin will be best secured by confinement to bed during the eruptive period, and for some time after; and this should be insisted on, even in those cases marked by the

¹ The prophylaxis of scarlet fever is a subject worthy of attention. The induction of what may be called the belladonna disease, has been proposed as a preventive of scarlet fever. But is not this a spurious imitation only of Jenner's preventive of small pox? It seems to be founded upon false and superficial philosophy,—if philosophy it can indeed be called. The cow pox is a zymotic disease, like small pox itself. It resembles small-pox in its external character, and like small-pox, as a general rule, is liable to occur only once in a life-time. But these relations do not hold with the belladonna disease and scarlet fever. Scarlet fever is a zymotic disease; belladonna is not a zymotic disease. Notwithstanding the similarity in the colour and in the locale of the two diseases, they are essentially different in their characters. Scarlet fever rarely occurs more than once in a life time; the belladonna disease may be re-produced at pleasure.

The discovery of some mild allied zymotic disease, which shall prevent the occurrence of

utmost mildness, which is no guarantee that evil will not arise. The maintenance of due warmth,—not of exciting heat,—by a sufficiency of bed clothes, is indispensable; and a moderate determination to the skin is well promoted by the liberal use of warm non-stimulating diluent drinks.

A perspiring condition of the skin, both during and after the eruption, will be materially promoted by the same diluent warm drinks, recommended for the fulfilling of the first indication. The employment of the warm bath will be useful. The writer has been in the habit of ordering it every night during the eruption, and he has reason to believe that it has been serviceable. He must, however, confess that it has not proved, in his experience, the absolute preventive which some writers have reported it to be, in theirs. In cases No. 7, and No. 8, both of general dropsy, the bath was used every night with every possible care to insure its efficient operation. During desquamation, it would perhaps be well to employ the bath night and morning, proportioning the time of immersion to the strength of the patient; and it is not unlikely that its beneficial operation would be increased by the employment of soap, which would assist in the removal of the excessive epithelium. The bath, it may be well to remark, can be useful or safe, only where due subsequent warmth can be secured, and where proper attention can be paid to the drying of the patient.

The congestion of the kidney will meet with some hindrance from the employment of those means, which are recommended for fulfilling the two first indications. A lax condition of the bowels, giving two or three liquid stools in the day, will go far to reduce the chances of inordinate or dangerous congestion of the kidney. The avoidance of stimulating diuretics, or other medicines or cordials which have a tendency to the kidney, will prove a bar likewise to the occurrence of the apprehended evil.

The promotion of the secretions of the liver and alimentary canal, is readily effected by very safe means. Small doses of mercurials, such as calomel, or mercury with chalk, will, when indicated, secure the secretion of the bile. Purgatives or laxatives, according to circumstances, will secure the secretions from the alimentary canal. Their moderate administration, under ordinary circumstances, during the whole period of the eruptive disease, is perfectly safe. The saline purgatives are to be employed with some caution. In being liable to be taken into the circulation they may irritate the kidney; and if obstructed in their passage by that outlet, and retained in the body, they may prove injurious. Castor oil, senna, rhubarb, jalap, and scammony, are perhaps the safest. Where a strong purgative is necessary (which will be seldom), croton oil may be given.

In addition to these indications for the prevention of disease of the kidney, perhaps another may be suggested, viz., the abatement of that persistent and general desquamation of the cuticle (really a disease of morbid activity or growth), which seems actively to favour the develop-

scarlet fever, as cow pox prevents small pox, is perfectly feasible, and should lead to active investigation. Inoculation for scarlet fever is too dangerous to be adopted, at all events, according to the limited observations on record. Possibly a milder disease might be produced, by the transfer of the virus to some of the lower animals; and re-inoculation successfully practised upon the human subject.

ment of disease of the kidney. The writer is not aware of any means which have been used for the cure of this hypergeny of the cuticle; but it is not unlikely, that the remedies successfully employed in the constitutional squamous diseases would be useful. Slight mercurial alteratives and purgatives would be worthy of trial. Under ordinary circumstances, they would at least be harmless.

It would be a rule fraught with much safety to the kidney and security against anasarca, to insist on every sufferer from scarlet fever, however mild the disease, remaining strictly in bed during the eruption, and for several days after its decline; and to keep the patient within doors for three or four weeks from the time of the commencement of the eruptive disease. By such a rule, many attacks of anasarca would be prevented, and not a few lives saved. It is true this would be effected at the cost of some tedium and irksomeness; but the result would warrant the outlay. Perhaps, in the course of time, observation will enable us to pronounce who are, and who are not, likely to suffer, and to select with accuracy the former only, as requiring prolonged confinement. In the meantime, however, no such selection can be made; and to prevent danger, all should be subjected to increased vigilance.

80 Park-street, Grosvenor-square, January 1849.