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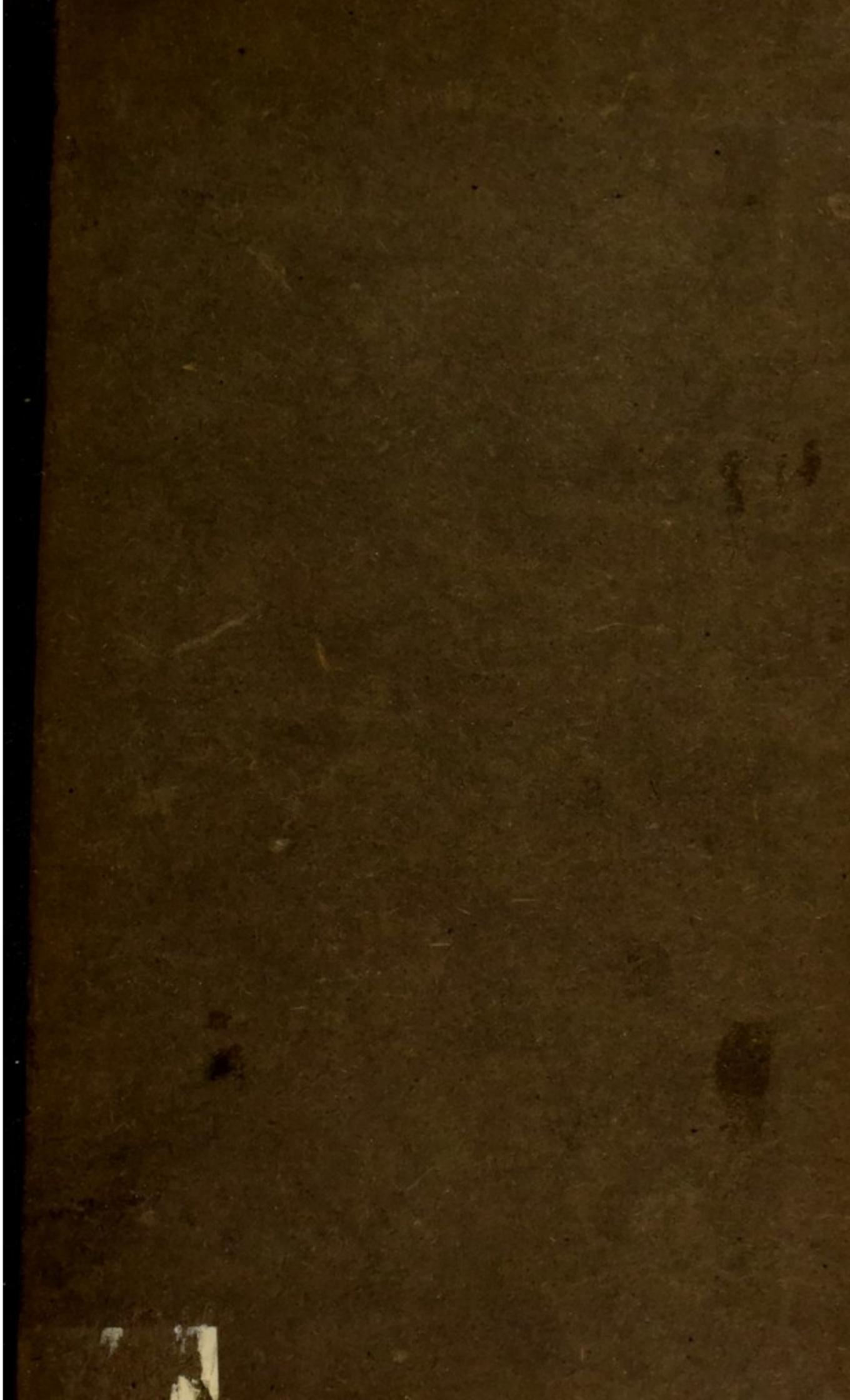
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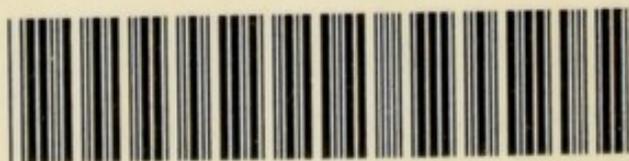


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CLINICAL INQUIRIES

INTO THE INFLUENCE OF THE

NERVOUS SYSTEM AND OF DIATHETIC
TISSUE-CHANGES

ON

THE PRODUCTION AND TREATMENT OF

DROPSIES.

BY

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CLINICAL INQUIRIES.

I. INFLUENCE OF THE NERVOUS SYSTEM.

ALL the current theories of dropsies and dropsical effusions, however varied they may be as to details, can be finally referred to some simple doctrines of hydraulics and hydrostatics. Few of modern pathologists entertain the notion that the nervous system is involved, and that the morbid process may be a defect in nutrition. Professor Virchow, however, discusses it, and endeavours to show that *œdema fugax* and *hydrops spasticus, hystericus, and paralyticus* of authors are kinds of dropsical effusion which occur in the course of a dropsy due to a cachectic watery blood-state,—a “hydræmia,”—and that they occur simply from congestion of the vessels of the part affected. When this takes place, the serum of the watery blood escapes of necessity more readily there than elsewhere where no special congestion occurs.¹ This and all other theories fail, however, to explain various circumstances observed in the origin and course of dropsies when carefully scrutinized. In especial, cases of cachectic dropsy, in which the causes are general, the limited exemption of certain localities from effusion, as well as of the effusion itself, is remarkable. Thus Andral observes, as to the order of development of anasarca in cardiac dropsy, that although the legs usually swell first, and then the scrotum and penis, in some they became anasarcous at the same time; while, in others, the latter only became infiltrated when œdema is already manifested at many points: this—“En vertu de ces inexplicables dispositions individuelles que nous retrouvons sans cesse dans l'étude de la pathologie.”² So also, he noticed that in a certain proportion of cases of intermittent fever there was œdema of the lower limbs during con-

¹ Handbuch der Speciellen Pathologie und Therapie, vol. i. p. 120.

² Clinique Médicale, tom. iii. p. 537.

valescence (paraplegic anasarca), but why it came on he was at a loss to explain, for there was no disease of the heart or large vessels, or liver, or spleen. It usually disappeared in from twelve to fifteen days, with copious perspirations.¹ It is, however, when the seat and extension of anasarca are ascertained by measurement that the most striking exceptions to current theories are observed, and such as incontestably show that some hitherto unrecognised influences determine the locality and extent of the effusion. Now, I propose in this paper to show that almost all anomalies may be explained by referring them to the influence of the nervous system on the tissues affected, with two distinct and apparently antagonistic results, namely, the prevention as well as the causation of watery effusion of serum. When we consider how contradictory current theories are, how empirical, and too often how unsuccessful the treatment, and how common and distressing these dropsical maladies, such a fact must be of great practical importance; but of still greater, when the inquiry is found to throw light on all these common and fundamental morbid changes, known as congestion, inflammation, degeneration, retrocession, metastasis, and the like.

It is right, however, to explain, *in limine*, that I have already directed the attention of the profession to this important subject. In the Medical Times and Gazette for 28th December 1861, a case is reported with my remarks upon it (Case V. in this paper), in which an attack of hemiplegia was followed by the almost complete cessation of anasarca in the unpalsied limbs. Again, in the same Journal for 31st May 1862, there is a published clinical lecture by me on the Physiognomical Diagnosis of Dropsies, in which the nature and causes of metastatic anasarca and of nervous and local cedemas are fully considered. Thirdly, on 25th April 1865, I communicated a paper on the subject to the Royal Medico-Chirurgical Society of London, in which the inhibitory or preventive influence of the nervous system on dropsies was particularly set forth. And, fourthly, for some years past, I have called the attention of both my systematic and clinical class to the facts themselves, and to their practical bearings on the doctrines of so-called metastasis, and of congestion, inflammation, diathetic degenerations, and other fundamental processes. And I would further add, that anasarca has been selected for observation rather than albuminuria and effusions into shut sacs, for the sake of greater clearness and simplicity. For the same reason, the arrangement of the various kinds of dropsies which I have adopted is that of diseases of the nervous system in general. I therefore speak of centric and reflex dropsies, of general dropsies, and of paraplegic, hemiplegic, facial, and other local effusions, according as the disease extends over entire symmetrical regions, or is limited to a local system of nerves and nerve-influence.

¹ Clinique Médicale, tom. i. p. 482.—(Fièvres.)

NERVOUS DROPSIES OF CENTRIC ORIGIN INVOLVING
PRIMARILY THE TRUNK AND LIMBS.

1. *Hemiplegic Dropsy*.—Hemiplegic dropsy is that kind of dropsical effusion which is limited to one-half of the body, or to the limbs on one side, and if a viscus be affected consecutively, the effusion is either exclusively or predominantly unilateral. The following case is an example as reported by Dr Smart, formerly one of my clinical clerks.

CASE I.—*Cardiac Dropsy with Pericarditis in a Man aged 56; Hyperæsthesia of the Right Side of the Thorax; Anasarca of the Left Side of the Body; Effusion chiefly into the Left Pleura.*

An Irish field-labourer, married, æt. 56, was admitted under my care into the Royal Edinburgh Infirmary on 9th December 1861. About six weeks previously he was exposed to wet and cold while at work, and became ill, with a severe dry cough, shortness of breath, a difficulty in making water, and swelling of the legs. About a fortnight before admission he became much worse in his breathing, the difficulty in passing urine increased, and the swelling of the legs gradually extended upwards to the thighs and trunk.

On admission, the patient had great and painful dyspnoea when recumbent, and was ready to faint when placed in the upright position. He laid persistently on his left side, and complained of being "smothered" if placed upright or on his back. He passed urine in bed, but that which was collected was found to be slightly albuminous. The upper or right side of the thorax was painfully sensitive to touch, so that very little examination was possible; but it was observed that the œdema was limited to the left half of the face, neck, trunk, and scrotum. The tongue also was dry on the right half and moist on the left. In about five days, however, the patient had improved so much under treatment that it was possible to move him, and he was more carefully examined. The left eyelid alone was observed to be œdematous and the conjunctiva infiltrated. Œdema of the trunk was great, but limited to left side. It was also limited to left half of the scrotum and penis, and more developed in left leg and thigh. Measurements showed the circumference of the right thigh at lower third to be $13\frac{1}{2}$ inches, of left thigh at same point 15 inches; of right calf 11 inches, of left calf $11\frac{3}{4}$ inches. The motor power and cutaneous sensibility of the œdematous side seemed to be unaffected. Persistent hyperæsthesia of the non-œdematous side; mental condition marked by extreme depression and querulousness, with tendency to abstraction and somnolency. After a period of improvement, in which the urine amounted to 64 oz. daily, and free from albumen, a sudden diminution of the secretion occurred, and albumen was present. The hyperæsthesia increased, so that a slight touch gave pain; the breathing became more difficult and laborious; the anasarca became more general; a state of semi-coma came on, and death followed in a few hours. On a *post-mortem* examination, the left pleural cavity was found to contain 100 ounces of serum, the right pleural cavity 50 ounces; the left lung was greatly compressed and spleen-like; the bronchial membrane congested and red throughout both lungs, and the tubes filled with a muco-purulent fluid. The pericardium was greatly thickened and firmly adherent to the heart throughout by adhesions partly of old standing, but chiefly recent. The cardiac walls were of the normal thickness, the valves healthy. The kidneys contained a few cysts, but were otherwise healthy. Liver of natural size, slightly congested.

In this case, the hemiplegic effusion, in the first instance, was unilateral throughout. The left pleura was involved co-incidentally

with the left half of the head, neck, and thorax ; and but for the copious effusion into the pleura, the left lung would have probably been œdematous also. It was not clear whether the unilateral moisture of the tongue was accidental or not, probably the former.

NEURO-VASCULAR AREAS IN ANASARCA.—Hemiplegic œdema is usually referred to the position of the patient, and therefore caused by gravitation, whenever the fluid is present only on that side on which the patient lies ; or else it has been attributed to the obstruction of a large vein in the region of the neck or shoulder. Obstructive œdema being thus caused, the effused fluid gravitates and fills the cellular tissue of the corresponding side. Either theory, however, wholly fails to explain the distribution of the dropsical fluid in this case. I do not know, indeed, whether it has ever been shown that there is such an intimate connexion between the areolar tissue of the two sides of the thorax, and of the thorax and abdomen, that effused fluid *can* pass freely from the areolar tissue of one region to that of another. I asked my friend Mr Turner, demonstrator of anatomy in the University, to make the experiment of injecting water into the subcutaneous tissue of the thorax and abdomen of a corpse, and watching how it was diffused. The solitary experiment he was able to make in my presence seemed to favour the conclusion that the cellular tissue is continuous, and dropsical fluids may pass from one portion to another under the influence of physical forces. But, when compared with the experiments of nature, it leads to another conclusion also. Cases are occasionally observed in which there is obstruction of the upper venous trunks of the body, and dropsical effusion results. Dr Watson mentions in his lectures an example of this kind, in which the neck and face were hideously bloated, and the arms so hugely swollen with water, that they could not be brought to the sides, but the lower limbs appeared preposterously small, because they remained of their natural size. The cause was found to be pressure of a large aneurism on the superior *vena cava*, close to the auricle. Now, if there be continuity of the cellular tissue throughout the trunk and legs, the fluid in this case should have gravitated from the face and neck downwards, infiltrating through the areolar tissue of the thorax and abdomen to that of the legs, but it did not. On the other hand, when anasarca begins to show first in the legs, the cellular tissue should fill like a bottle from below upwards. And, indeed, to ordinary observation, this appears to be the way in which general anasarca advances, but in certain cases it is not so. I carefully marked the progress of œdema in a highly cachectic patient, who (it was found after death) had embolism of the left femoral and common iliac veins, and of the inferior vena cava. First, the left leg became œdematous, then the right, and afterwards the loins, and so upwards along the back. But when the œdema reached to the level of the seventh rib,

it ceased to advance upwards, and the thorax and arms remained free from dropsical swelling up to the death of the patient. Yet, according to the bottle-filling theory, the anasarca should have gone higher and higher. And this is not a solitary case. Hence it follows that although the cellular tissue may actually be so continuous as to allow the diffusion of water equally in all directions, when effused into it, as in Mr Turner's experiment, there is nevertheless a prior condition required for its effusion; and that seems to be either a condition of the living tissue itself or of its capillaries.

In the instances of thoracic œdema from venous obstruction, the anatomical distribution of the venous and arterial capillaries certainly plays an important part. I had a patient lately under my care in the Edinburgh Infirmary, whose face was turgid and the thorax œdematous from the pressure of an aneurism on the upper venous trunks. This revealed the fact that the cutaneous thoracic circulation has a limit not known to anatomists, being sharply bounded below by a line corresponding very nearly with that of the sixth or seventh ribs; for in this patient the whole surface of the thorax to that point was livid with distended venous capillaries, whereas, beyond, the skin was free from capillary congestion. And I have observed (now in more than one hundred instances) that a line of vascularity stretches along this level in certain persons who are of an emotional temperament, with a tendency to diseases of the vascular system. I have termed it præcordial vascularity, from its site, for in the majority the line is broken like an imperfect rainbow, and the chief fragment is seen on the left side, below the left mamma. In a certain proportion of cases, however, it runs in an unbroken curve across the epigastrium into the right infra-mammary region, in a breadth of vascularity of from six to ten lines. This capillary congestion is not due to mechanical causes,—*Firstly*, Because those who have it to any extent are invariably found to wear their clothing lightly. *Secondly*, Because the dilated vessels change colour according as the patient's mind is active or quiescent. *Thirdly*, Because the same region is not unfrequently the *first* seat of œdema in a case of general dropsy. This I term a *præcordial œdema*.

These are examples of a fact too little recognised,—namely, that there are distinct areas of vascular action and capillary distribution which have their corresponding nerve-centres (NEURO-VASCULAR AREAS), and which have limited inter-connexion with each other. It is probably for this reason that the seats of herpes zoster may be referred to the distribution of cutaneo-spinal nerves. Whether the functions of the venous radicles and of the absorbents are under this influence remains to be established. *A priori*, the question may be answered affirmatively rather than negatively; and the few experiments made as to the veins confirm this conclusion. Be this as it may, it is certain that the gravitating, congestive, and obstructive theories are wholly inapplicable to

numerous cases of anasarca. In that under consideration, only the symmetrical half of the penis and scrotum was œdematous, and yet the whole of the external genitals was equally dependent. So also one eyelid was œdematous, while the other was not. Still more restricted areas of effusion may be sometimes seen in cases of general dropsy. Thus I have shown to my clinical class two patients in the same ward, both with general renal dropsy: in the one, the prepuce was infiltrated, while the scrotum was free; in the other, the scrotum was infiltrated, while the prepuce was free. Now, in these cases there could be no question as to the fact that the force of gravity was exercised equally upon the tissue which was infiltrated and the tissue which escaped infiltration. Why, then, the difference in the extent of effusion? Inflammation removes a dropsy of the scrotum, but there was no inflammation; exposure of a part to cold will excite effusion, but all the tissues were kept equally warm. Nor is the order of anasarcous effusion, as manifested in different and distant parts, less referable to current theories. Too little attention has been paid to this clinical fact; yet it is of considerable practical importance. It is very well shown in the following history of a case under my care:—

CASE II.—*Cardiac Dropsy, with Bright's Disease and Pericarditis; Erratic Order of Development of Anasarca; inhibited in Left Hand.* (Reported by Dr Smart.)

George S., aged 66, married, an engine-man, admitted April 14, 1863, into Paton's Ward, Edinburgh Royal Infirmary, under care of Dr Laycock. The patient, an old soldier, who had served seven years in the West Indies, states that he enjoyed good health until a fortnight ago, when he had to give up work in consequence of his *thighs swelling*. *Scrotal and preputial œdema followed*; then of the *legs and feet*; afterwards of the *abdomen and face*; and, lastly, of the *right hand*; the *thighs and left hand not swelling*. On admission the pulse was 80, hard, jerking, and irregular; pulsations generally visible; precordial vascularity existed; transverse cardiac dulness measured $4\frac{1}{2}$ inches; apex beat behind sixth rib in a line vertical with nipple; a double friction murmur is heard over whole of precordia, but most loudly at mid-sternum. There is also a blowing murmur, which is loudest at apex. Second sound accentuated. There exists marked dulness, with increased vocal resonance, and coarse crepitation at the bases of both lungs behind. Considerable cough, dyspnœa, and expectoration, which is bronchitic. The urine had a density of 1·013, with abundant albumen and granular tube-casts. Both lower extremities, scrotum, prepuce, and right hand (not left, which was always the dependent hand when he lay in bed) are extremely œdematous. Thorax, face, and eyelids are slightly so. The parts became affected with œdema in the order mentioned in the previous history. Other systems are normal.

Dr Laycock ordered ℞ Tr. digitalis, ℥ss.; liq. ant. tart. ℥iij.; aquæ, ad ℥xi.—℥. Sumat ℥i. ter die. A blister to be applied between the shoulders.

On the 15th April, the report states that the dyspnœa is less urgent, and œdema, albumen, and tube-casts diminished.

On the following day, to increase diuresis, which was scanty, the tincture of lyttæ was substituted for antimonial wine. The patient continued to improve until the end of April, when cardiac action became very irregular and tumultuous, accompanied with severe precordial pain and urgent dyspnœa.

Next day, profuse hæmoptysis supervened; general œdema rapidly increased; the dyspnœa became extreme; and he died on the 4th of May.

Autopsy.—The whole body was œdematous. Pericardium distended with serum, and a band of organized lymph, half an inch in length and breadth, tied the base of left ventricle to the inner surface of the pericardium. Mitral valves greatly thickened. Those of the aorta slightly incompetent. The vessel itself dilated and atheromatous. There was considerable chronic and some acute condensation at bases of both lungs. Mucous membrane of bronchial tubes congested.

In this case there was a remarkable absence of anasarca in that arm which the patient had under him, for *decubitus* was on the left side,—a fact wholly beyond the gravitating theory; but the order of development is not less remarkable, inasmuch as the thighs and genitals became œdematous before the feet and legs. It was facts of this kind which attracted Andral's attention, and which, in common with all of us, he could only consider as inexplicable caprices, because referable to no known theory of anasarca.

The case of hemiplegic anasarca just detailed was simply cardiac; but cases of renal dropsy present the same peculiarity as is shown by the following history:—

CASE III.—*Renal Dropsy in a Woman aged 40; Anasarca chiefly on the Right Side of the Face, Limbs, and Thorax; Hyperæsthesia of the Right Side of Face and Right Arm; General Convulsions, except in Left Arm and Left Side of Face; Death; Brain œdematous; Clots in Optic Thalami.*

Johanna P., aged 40, wife of a ploughman, was admitted to Ward XI. in the Royal Infirmary, Edinburgh, on February 15, 1865, to be under the care of Dr Laycock.

History.—Patient enjoyed good health until four months ago, when, after exposure to cold and wet, she suffered severe pain in the loins, followed by swelling, first of the face, then of the legs, and, lastly, the body generally. The urine was scanty and high coloured; thirst great. She had not menstruated for the last six months. On admission she complained of severe frontal headache, and pain in the right lumbar region, which did not subsequently remit much. Skin dry. The urine albuminous, with tube-casts. Anasarca was general, but most markedly on the right side. As *decubitus* was on that side, this difference was at first considered to be due to gravitation; but for seventeen days before death she lay supine; and, on observing her position when on her side, it was seen that the left arm was so dependent over the chest that if there had been any extensive œdema the hand and forearm must have shown the infiltration of gravitation. The thighs and abdomen were much swollen; but the left calf only measured 11 inches round, while the right calf, at a corresponding point, was $14\frac{1}{2}$,—difference $3\frac{1}{2}$ inches. The right wrist measured 7 inches, the left was not swollen at all, and was 5 inches round,—difference 2 inches. The left forearm was swollen, and measured $8\frac{1}{2}$ inches at a point 2 inches below the elbow, but at the same point the right measured $9\frac{3}{4}$ inches,—difference $1\frac{1}{4}$ inch. The right arm and right side of the thorax were hyperæsthetic, not so the left. The left eye and left side of face showed hardly a trace of œdema, the right eyelids were swelled like bladders. All this under such circumstances of *decubitus* that the force of gravity could have little, if any, influence in the diffusion of the watery fluid from one limb or side to the other. A week before death, the right side of the face (the dropsical side) became highly sensitive to touch, and frontal headache was complained of: two days before death, the patient had repeated convulsive attacks, in one of which she died comatose. During these attacks the left arm

and left side of the face (the non-dropsical side) were not convulsed. The head and face were twisted towards the left side. The anasarca distention of the thighs and abdomen, and of the right side, was enormous for a few days before death.

Autopsy, thirty hours after death.—Effusion into the peritoneum, pleuræ, and pericardium; no important lesions in other organs except the brain and the kidneys, which latter were in the second stage of the inflammatory form of Bright's disease. The tubes of the cortical substance were full of exudation; epithelium in a state of fatty degeneration; the right kidney large, the left small, and of a peculiar form. The brain was œdematous throughout; both of the thalami contained clots,—that in the right thalamus the larger. A papilla of brain-substance (grey matter) projected like a wart from the surface of the wall of one of the ventricles.

HOW FAR DO CARDIAC AND RENAL DISEASE AND ANÆMIA CAUSE DROPSY?—In the preceding cases the well-known coincidence of general anasarca and disease of the heart and kidneys is illustrated. This is, indeed, of such common occurrence that the diseases are usually considered to stand in the relation of cause and effect. In cardiac dropsy the obstructive theory is applied, and it is argued that the anasarca is due to the venous congestion which results from dilatation and insufficient action of the right side of the heart, consecutive to fatty or other degenerations of the organ, to emphysema and other chronic and congestive diseases of the lungs, and to obstructive valvular diseases of the left heart. It is certainly impossible to watch the progress of a case of this kind without observing that the dropsy advances *pari passu* with the pulmonary and cardiac congestion, and the conclusion naturally follows that the more pressing condition—the congestion—is the efficient cause of the dropsical effusion. But, then, it is also observed that similar cases as to the state of the heart and lungs occur, in which there is the most distressing pulmonary congestion, leading to extreme dilatation of the right heart, hæmoptysis, and death by pulmonary apoplexy, with little or no anasarca or albuminuria. What morbid condition, then, is wanting in these non-dropsical cases of cardiac disease which is so strikingly operative in the dropsical? It may be advanced that there must be a conjoined hydræmia,—a watery condition of the blood,—but then this condition does not appear to be very manifest in various cases of general dropsy connected with structural disease of the heart. On the other hand, in a certain proportion of cases of cardiac dropsy the dilatation of the heart and the pulmonary congestion are consecutive to the anasarca. In these it is argued there is anæmia or hydræmia in the first instance, which weakens the contractility of the vessels, so as to allow the too watery serum to transude; then this condition acts as an impediment to the arterial circulation, requiring a greater power of cardiac impulse to overcome it. But inasmuch as the heart is also enfeebled by the poor blood as well as the vessels, it is unequal to the effort, and dilates. Thus the anasarca is not the result but the first cause of the dilatation. Chlorotic œdema and renal dropsies

are usually adduced as illustrations of this kind of dropsy. There can be no doubt whatever that poor blood and congestion of tissues and viscera, caused by mechanical obstruction of the circulation at the centre, however arising, are general causes of dropsy and of serous effusions when certain other conditions of the blood and bloodvessels coincide; but why in the cases of both cardiac and renal dropsy under consideration was the dropsical effusion wholly or partially hemiplegic? As to both sides the general causes are the same, whether we consider the state of the blood or of the central force-pump; and the anasarca is duly manifested in the one-half of the body; but why is it absent or less on the other half? Now, clinical observation enables us to separate the cardiac and pulmonary conditions from the hæmic, and to show that hemiplegic œdema will occur when there is neither renal disease nor obstruction to the circulation in either the heart or lungs. In proof I give the following history:—

CASE IV.—*Hemiplegic Hyperæsthesia and Œdema; Glycosuria; no Disease of the Lungs, Heart, or Kidneys; probable Spinal Disease. Syphilis(?)*.

Catherine L., a dressmaker, aged 32, was admitted into the Royal Infirmary, under my care on 20th January 1860. One year previously, after exposure to cold, she had rigors, severe frontal headache, and pains which extended to the back of the head, the neck, and between the shoulders. They continued with little intermission for about four months, during which period the patient was confined to bed. She gradually recovered and resumed her ordinary employment. Three months previously to admission she again caught cold, and with precisely the same result, only now there was swelling of the right side of the face and of the right foot, in addition to the neuralgic pains. A fortnight before admission the patient got her feet wet, and all the former symptoms were now aggravated. The right side of the face was much more swollen, and was painful to touch; the left side was quite unaffected. The right knee, leg, and foot were also œdematous and painfully sensitive. On more careful examination it was observed that her complexion was sallow; that on rising from the horizontal position she supports her head with her hands to prevent the pain caused by the movement of her head and neck; that the right pupil is dilated, and the eyeball more prominent than the left; the right eyelids (upper and lower) are œdematous, and the œdema extends along the right side of the face downwards over the right parotid, and for a short distance down the right side of the neck, immediately below the angle of the lower jaw. The skin of the right side of the face is more sensitive to pressure than to simple touch, and there is tenderness on percussion over the seventh cervical and first and second dorsal vertebræ, which are also prominent. The right calf and ankle are slightly œdematous, and there is tenderness over the inner condyle of the femur, but no swelling.

The appetite was good; respiration natural; pulse feeble, 80; a slight systolic murmur at base of heart. The skin showed brown discolorations (syphilitic?). The urine of sp. gr. 1012; no albumen; sugar in considerable quantity, and also indican. Formerly menstruated every fortnight, and very abundantly, but not for two months past.

CENTRIC (NERVOUS) INHIBITION OF ANASARCA.—In the case just detailed there were certain indications of anæmia, or more probably of a syphilitic chlorosis, to which the dropsy might

be referred. But these are general causes of dropsy; yet the anasarca was not general, being restricted to a certain region of the body. Striking symptoms pointed more distinctly to a centric lesion inducing glycosuria, and specially involving one-half of the cilio-spinal region of the axis, or the nerves on one side; so that if it be admitted that the causes of the anasarca were general, then it must be inferred that they were restricted in their operation by the condition of the nerve-centres. Doubtless the simpler explanation is, that the portion of the nervous system in connexion with the anasarcaous tissues was enfeebled, while all the remainder was healthy; and such a theory certainly affords a sufficient explanation of numerous cases. But there are inequalities in dropsical effusions not to be explained by it, and as to which it is necessary to conclude that a certain morbid condition of a portion of the nerve-centres inhibits anasarca. As this fact in the pathology of dropsies has not hitherto even been so much as surmised, I shall endeavour to show how such inhibition occurs.

CASE V.—Cardiac Dropsy (Pericarditis and Valvular Lesions) in a Woman aged 30; Hemiplegia of Left Side from Embolism of the Middle Cerebral Artery of Right Side; thereupon Anasarca disappears greatly from the Right Side, increases greatly on the Left.

A female servant, aged 30, a large and well-developed, well-nourished woman, reported to be of somewhat intemperate habits, was admitted under my care into Clinical Ward XI. Royal Edinburgh Infirmary, on 23d October 1861. Five years ago, when in good health, she had shivering, followed by cough, difficulty of breathing, and palpitation. Three weeks ago or more, about her menstrual period, the cough and palpitation became more severe, her appetite much impaired, nights sleepless. Two days before admission her legs began to swell; she menstruated on the day of admission, and had severe pain in the back. She complained of pain in the region of the heart, palpitation, and urgent dyspnoea. Face congested, lips livid, superficial veins of neck turgid and pulsating. Urine scanty, not albuminous. Feet and legs anasarcaous, and slight œdema of the hands, which are of cadaverous coldness. In fourteen days the œdema had reached the trunk, the whole of the lumbar region being very anasarcaous, and in eighteen days a trace of albumen was detected in the urine. In twenty-four days the legs were so tense and painful that an incision was made over the left ankle, and numerous lancet punctures over the right, with the view of allowing the effused fluid to drain away. Shortly after, at the same date, an attack of hemiplegia occurred. The facial muscles of the right side were strongly contracted, the mouth twisted to the right side, and the tongue, when protruded, inclining to the left. Articulation indistinct; motion of left arm wholly lost; of left leg much impaired. Sensibility of left side unimpaired; pain complained of over the right parietal eminence. The œdema in the left arm now increased very rapidly; and the left leg became more distended, but in a less degree. The motion of the left side of the thorax became more and more defective; the breathing laboured; swallowing difficult. In two days the left side had lost its sensibility, and the anasarca had constantly increased. The right thigh and leg, on the contrary, became smaller and smaller, until the skin hung empty and shrivelled. She died in four days from the hemiplegia, and twenty-eight days from the last menstruation.

Post-mortem examination by Dr Haldane.—Well-marked œdema on the left side of the body. Abundant subcutaneous fat. Pericardium adherent to apex of heart by a strong fibrous band. The heart, especially the right side,

gorged with blood. Near the apex of the left ventricle was a globular clot of the size of a large filbert, of a brownish red colour, softened in the centre. The appendix of the left auricle, and the right auricle and ventricle contained similar clots. Aortic valves incompetent, thickened, two of them shortened. Adherent to the margins of each were fleshy growths. Mitral orifice contracted, of diameter $\cdot 72$ inch; the edges of the valves thickened, and a little glueing together of the chordæ tendineæ. The left ventricle was dilated. The right ventricle dilated and hypertrophied; the diameter of the tricuspid orifice $1\cdot 6$ inch, its circumference 5 inches. The lungs were adherent to the pleuræ, most extensively on the left side, congested and œdematous. The bronchial mucous membrane greatly congested. Liver moderately firm and presenting the nutmeg appearance; spleen firm and congested; cœcum congested.

Head.—Membranes of the brain quite healthy, only a little fluid in the ventricles. The middle cerebral artery lying in the right fissure of Sylvius was found to be obstructed by a clot of the same kind as that observed in the left ventricle, just at the point where it divided into three branches. In one of these there was a loose, black, secondary clot fully half an inch long.

I submit that this case establishes the important clinical fact that a morbid state of the nervous system has an influence in both removing and aggravating anasarca in a case of cardiac dropsy. For while the wholly palsied left hand became rapidly more œdematous after the palsy came on, and the left leg continued swollen although fluid was oozing from the incisions near the ankle, the œdema diminished in extent in the unpalsied arm, and disappeared altogether in the unpalsied leg. Formerly, before the discovery of cerebral embolism, such a case would have been considered an example of "serous apoplexy," and the disappearance of the anasarca looked upon as the cause. In short, it would have been classed with cases of "serous metastasis." A more correct pathology enables us to say that the embolism of the right middle cerebral artery was the cause of the palsy of the left or opposite side, and it seems equally probable that for the same reason the anasarca disappeared on the right or same side. And this view explains the true nature of Cases I., III., and IV. For if we were to suppose hypothetically, what is of no uncommon occurrence, that in this case the hemiplegia had preceded the anasarca, that would have been hemiplegic too; because, while the lesion facilitated dropsical effusion on the one side, it inhibited it on the other. But a clinical history will best establish this fact in the pathology of dropsies.

CASE VI.—*Symptoms of Syphilitic Cerebellar Lesion; Right Testicle wasted; Stricture and Purulent Urine; Hemiplegia of Left Side of Face and Tongue, and of Left Arm. Œdema comes on in Left Arm and Leg.*

John B., aged 29, a plate-layer, unmarried, was admitted under my care into the Royal Infirmary, on 13th March last. Has had syphilis. Two years ago, he had stricture of the urethra, so that he could pass urine in only a small stream. At the same time he began to suffer from frontal headaches and impairment of sight, more especially of the right eye. Objects assumed curious aspects in shape and colour; for example, they appeared crooked, spiral, bent, or interrupted in their continuity; and in colour yellow or blue. Three weeks ago, shortly after supper, he was suddenly seized with giddiness, so that he had to hold on to prevent himself falling, and immediately afterwards he

vomited. Both giddiness and vomiting lasted three days. When questioned, it is found that he can only read the largest type, and has the visual illusions described; hearing and taste are also much impaired; he has much occipital headache, and he staggers as he walks, his legs feeling weak and shaky. A slight systolic murmur is heard at apex, and a loud ringing diastolic murmur over whole chest, but loudest at third left costal cartilage near sternum. Pulsations visible generally. Bowels habitually costive; has a stricture so small as not to admit the smallest bougie; urine purulent. Right testicle wasted; penis small. On 23d March, he complained of shooting pains in his limbs, and, on 29th, he found, when he awoke in the morning, that he could not use his left arm. The left side of the face was palsied, and he protruded his tongue towards the left; eyelids unaffected. He could not lift his arm, but could grasp somewhat firmly; left leg unaffected. He articulated in a slow drawling manner; complained of pain in both the front and back of the head. On 1st April, it was observed that he slept a good deal; œdema was also seen to have affected both the arm and the leg on the left (palsied) side; the right arm and leg unaffected. In a day or two, the œdema diminished a little, and subsequently considerably. The measurements on 1st April (three days after seizure), were as follows:—Left leg (œdematous), one inch above malleolus, $8\frac{3}{4}$ inches; right leg (not œdematous), at same point, $8\frac{1}{2}$ inches; left leg above the patella, 12 inches; right leg, at same point, 11 inches. By the 19th May the œdema had disappeared, except at the left ankle.

As this case was under exact observation from the first, there can be no doubt that the hemiplegic dropsy followed directly upon the hemiplegic lesion as an effect thereof. It is remarkable how few exact observations are on record of this kind. Peter Frank, however, mentions an instance in his elaborate account of dropsies.¹ A corpulent man, paralyzed on the left side, was affected with hiccup when drinking mineral waters. This was relieved by opium; but now the urinary secretion was suppressed, and the whole of the left or paralyzed side became dropsical, the effusion being strictly limited to the middle line. We have here, then, at least two classes of dropsies in which centric nerve-lesion exhibits anasarca. One in which the lesion removes the anasarca existing, by preventing further effusion and allowing the absorbents to take up the fluid; another in which, when the causes of anasarca arise, the lesion facilitates the effusion on one side and inhibits it on the other.

PARAPLEGIC DROPSY.

Paraplegic dropsy, like paraplegia proper, may have its origin either in the spinal cord or in the encephalon. It is difficult to determine, however, in many cases where the morbid change first originates. In the reflex paraplegia connected with structural diseases of the kidneys and bladder there is the exact analogue of the paraplegic œdema which accompanies certain kinds—but not all—of Bright's disease. I say not all, because there is in these cases a much more complex problem to solve than is usually believed. Experimental researches have proved, on the one hand, that injuries to the crura cerebri and the base of the brain will induce albumi-

¹ "De Curandis Hominis Morbis," liber vi. § 749.

nuria as well as glycosuria. The former is explained by the theory of renal congestion, but the latter is obviously due to a change on the tissue processes. But, on the other hand, morbid or excited states of the genital organs have a direct influence on the brain itself, as is proved in various convulsive, paralytic, hysterical, and cerebro-mental disorders, and probably, therefore, on its nutrition. In Case III. it is probable that there was a direct causal relation between the diseased and painful right kidney and the predominant disease on the right side of the brain; also in Case IV., between the *right* wasted testicle and the palsy of the left side, due to defective activity on the *right* side of brain as well as the hemiplegic anasarca. The paraplegic paresis in the same case was probably also in relation with the stricture, the wasted penis, and the hallucinations of vision. The subjoined case illustrates the centric origin of both paraplegic anasarca and renal congestion, and the true nature and origin of the coma which so often coincides with albuminuria and Bright's disease.

CASE VII.—*Facial and Paraplegic Anasarca; long-standing Bright's Disease; Hæmaturia, Coma, and, thereupon, Disappearance of the Paraplegic Anasarca. Death. Syphilitic Disease of Cranium.*

James M., aged 37, admitted under my care into the Royal Edinburgh Infirmary, November 6, 1861. He was an old *habitué* of the charity, and had long-standing Bright's disease with syphilis. On admission he had distressing anasarca of the whole of the lower extremities, and œdema of the conjunctivæ, eyelids, and face, but the rest of the body was free. His forehead had baggy swellings beneath the skin. Urine highly albuminous, and, finally, hæmaturia came on, with violent pains in the legs from the toes to the groin. So soon as these were felt, the anasarca of the legs gradually lessened, and finally disappeared; and the patient as gradually sunk into a comatose state, in which he died.

On examination of the body, nearly half the frontal bone had a honey-comb appearance from extensive destruction. There was a complete perforation of the skull, two inches long and one broad, filled up with thickened periosteum and dura mater. The cranium, generally, was thickened, except the occipital bone, which was very thin; the brain natural; pericardium and heart natural; chronic tubercle of the lungs, chiefly of the right; small waxy deposit in the liver; blood in the intestinal canal, but especially abundant in the cœcum; the arteries of the villi waxy; the kidneys of natural size; the Malpighian corpuscles and the arteries had undergone amyloid degeneration; the tubuli atrophied.

Anasarca of the legs is almost universally attributed to gravitation, chiefly (I apprehend) because, when there is effused fluid in the cellular tissue of the lower extremities, the upright position increases the œdema, and the recumbent position diminishes it. But in the case just related, the œdema was great in the recumbent position, and disappeared considerably, with violent pains in the legs, evidently of a neuralgic character, and with, at least, paresis, if not palsy. The disappearance is obviously to be classed with the hemiplegic cessation of the anasarca noticed in Case V. It would be easy to explain the case as caused by uræmia, or on the theory

of a serous metastasis from the legs to the brain. But there was no unusual amount of serum in either the brain-tissue or ventricles; while, with a manifest encephalic lesion, the uræmic hypothesis is wholly gratuitous. The entire absence of any mental disorder excludes the hemispheres from consideration. The remarkable thinness of the occipital bone is not without significance as to the probable seat of the cause being at the base of the brain; but we are greatly in want of accurate observations as to the relations which local thinness and unusual density of the cranium bear to the encephalon and *its* diseases.

REFLEX DROPSIES DUE TO (SO-CALLED) SYMPATHIES.

Genito-Urinary Anasarca.—In the case just detailed, the face and eyelids were differentially dropsical. This selection of place of effusion was probably in relation (as I now propose to show) to a reflex action of the genito-urinary system on the face and eyelids, and illustrates the class of reflex or sympathetic dropsies.

The connexion between disease of the kidneys and dropsy has long been recognised. It is now an established doctrine that the dropsical effusion is mainly, if not wholly, due to the state of the blood, which, in the chronic cases, is greatly impoverished by the continual flux of albumen with the urine, and in the acute is supposed to be injured by the presence of a noxious agent, such as retained urea, or a febrific poison like that of scarlatina. And when albuminuria, without tube-casts, has been the chief symptom, the nervous phenomena which have been observed to be associated with it, such as puerperal convulsions, coma, amaurosis, and the like, have been rather attributed to the albuminuria than the renal affection and the nervous phenomena to a centric nervous lesion, as the common cause of both.

Three views as to this kind of anasarca may be adopted,—1. The current doctrine that the kidneys are primarily affected; or, 2. That the nervous system is affected first, and the kidneys become diseased and anasarca developed consecutively; or, 3. That the lumbo-sacral portion of the spinal cord is disordered by reflex action of both the urinary and genital organs, and that then the renal disease, the anasarca, and the nervous phenomena follow consecutively. I will endeavour to show that the latter and larger generalization is the most in accordance with all the facts.

It will at once be admitted that the genito-urinary system has an influence upon the nutrient and functional activity of the spinal cord. As to the testes, ovaria, and uterus, this law is abundantly established; as to the kidneys it is less certain, but the fact is compatible with existing views as to reflex paraplegia. In renal affections, then, thus arising, the morbid results will be manifested first in the kidneys, then in distant organs and tissues in functional or physiological relation with the urinary and reproductive systems.

They may be shown in disorders of either the circulation or the nutrition of the tissues, but if they consist in the effusion of serum from the capillaries, then as to the kidneys it will be an albuminuria, and as to distant tissues, œdema or anasarca. I shall not discuss nervous albuminuria now, being too large a question. If, then, we would determine what local reflex dropsies arise from the action of the genito-urinary system on the cord, we must first determine what tissues are in physiological relation with that system, or sympathize, in older phrase, with it. Clearly, we must first name the external genital organs themselves; consequently, we should expect dropsy of the labia, scrotum, and penis, to be an early and very common symptom in reflex genito-urinary anasarca. The skin and tissues of the loins and thighs come next in relation, and then the lower extremities. Now, this is very much the order in which "renal" dropsy appears. In that consecutive to scarlatina, and occurring in adults as acute dropsy, the genital organs and the lumbar region are commonly the first to swell, and often with singular rapidity. Nevertheless, that a reflex action from other abdominal organs as well as the kidneys will excite dropsy there is probable. A patient already referred to, who had anasarca after obstruction of the right iliac, suffered acute pain in the bowels during the evening; in the morning his prepuce and scrotum were œdematous.

Dropsy of the Eyelids.—It is in the eyelids, however, that reflex genito-urinary dropsy is most strikingly shown, because there is no *a priori* reason of contiguity why it should be. The eyelids constitute distinct neuro-vascular areas, and their vessels are affected from two sources of innervation. In emotional persons the *upper* eyelid becomes red from copious development of the capillaries, and when such persons are affected with cardiac dropsy, the upper lid is apt to become œdematous. It is the lower eyelid which is in peculiarly close relation with the genito-urinary system. In women, during menstruation, there is venous congestion there, and in chronic uterine diseases it becomes more or less infiltrated. In men this local œdema is sometimes very striking, giving the lower eyelid the appearance of a bladder of water; according to my experience this is invariably a mark of genito-urinary disorder or disease, although it seems to accompany hæmorrhoids also; but in these cases it is probable that the prostate is affected. When there is both an emotional temper and this reflex genital action, then both lids are alike affected by œdema and other changes. Thus, in neuralgia and epilepsy in women, with uterine irritation, the entire orbicularis of the eyelids will be marked out by pigment deposit, especially if the patient be of a dark complexion; so that it constitutes an almost perfect circle of discoloration.

It is in women, during the menstrual period, that this close relation between the eyelids and the genito-urinary system is shown in dropsy. The state of the blood at that time evidently predis-

poses to dropsical effusions. Thus, in Case V., at each menstrual period the anasarca was greatly aggravated. Occasionally, however, the eyelids became suddenly affected with œdema at this period, as in the following case:—

CASE VIII.—*Bronchitis, Bright's Disease, and Anasarca, in a Woman aged 24. Sudden Infiltration of the Eyelids at the Menstrual Period.*

Ann F., aged 24, was admitted to be under my care in Ward XI. of the Royal Edinburgh Infirmary on 5th December 1863. She had anasarca of the lower extremities, but most extensively of the right leg, and of the lumbar region and thorax. The face and eyelids free. Bronchitis, with œdema of the lungs. Urine highly albuminous and numerous tube-casts. On 13th January, she began to menstruate, but the flow ceased on the 14th after exposure to cold, and on the 15th the upper and lower lids of the right eye became suddenly œdematous; those of the left eye followed on the 16th. This orbicular œdema lasted two or three days, and then wholly disappeared. At the next menstrual period the face and neck became œdematous as well as the eyelids, causing a mechanical pressure on the windpipe: the general anasarca greatly increased, and she died on the 4th March.

This monthly development or exacerbation of œdema of the eyelids is not peculiar to women, as I have seen it in male patients (young men) with cardiac and renal dropsy, and in one case the anasarca generally was aggravated at monthly periods concurrently with great diminution in the urine.

Thoracic Dropsies of Genito-Urinary Origin.—In women the neck and thorax are also under the physiological influence of the utero-ovarian system. This is shown by the change in the mammæ and the thyroid body during menstruation and pregnancy. So also, in cases of renal anasarca in women, the neck and thorax sometimes become specially the seat of dropsical effusion. Occasionally, this is so much increased during the menstrual period that there is danger of suffocation, as in Case VIII. At the same time the renal symptoms are aggravated also. But it is not in renal dropsy this is exclusively shown, for females with cardiac dropsy manifest the same order of events. Thus, in Case V., the anasarca and pulmonary œdema were developed at one menstrual period, and death took place exactly a month after, or at the next. Other so-called sympathies might be mentioned, but these will serve for illustration of the fact, that the genito-urinary system has an influence in the production of thoracic dropsies.

THORACIC DROPSIES OF CENTRIC ORIGIN.

I have already indicated that in Bright's disease the eyelids, but more especially the upper lid, may be dropsical from centric causes in those persons who are of an emotional temperament, and have considerable vascularity, as a consequence, of the upper lid. The connexion of the heart's action with all our emotions, indicates that a source of nervous dropsies may be found in the emotional centres, and that consequently this fact has to be considered, in con-

sidering dropsies associated with diseases of the heart and lungs, and which may be either of reflex origin, or due to a common cause, having its seat in the cervico-dorsal spine. In determining that seat it is necessary to separate in the inquiry the cardiac relations from the pulmonary, seeing that the two organs have not only different nerve-centres, but very different relations to dropsy. Now, the connexion of certain painful affections of the heart, grouped under the term *angina pectoris*, with neuralgia of the arms, and most commonly of the left only, is well known. I have carefully traced the course of the pains in well-marked cases, and noted that the nerves involved are the external and internal cutaneous nerves (nerve of Wrisberg), and the intercosto-humeral nerves. These nerves are branches of the four lower cervical and three upper dorsal nerves, and are therefore derived from that portion of the spinal cord termed by Budge and Waller the "cilio-spinal," by Claude Bernard the "oculo-spinal" region, and which is so named because from hence are derived motor fibrils which influence the movements of the eyelids, iris, and eyeballs. If, then, this spinal region have an influence upon dropsical effusions into the cellular tissue of the arms, and thorax, and eyelids, it will be manifested not only by causing, but by preventing them. Now, such prevention or inhibition will, I believe, be found to be of no uncommon occurrence, provided cases be properly observed. Case III. is a striking illustration of this form of differential dropsy, and also that of the engine-man, Case II., although in a less degree.

It is to be observed, also, that when both arms and both sides of the thorax are anasarcaous, they are often affected unequally. A woman, aged 54, has been under my daily observation in the Infirmary during the winter trimestre. She has Bright's disease, with frequent hæmaturia and great pulmonary distress. Her legs and thighs are anasarcaous; she lies on her left side and the left arm; and the left arm, left side of the thorax, and left side of the face, including the eyelid, are much distended with fluid; but the right arm, right side of the face, and right eyelid are free, except when the anasarca is greatly aggravated. On these occasions the dorsum of the right hand and the under surface of the right wrist become, in some degree, oedematous, evidently from gravitation of fluid from the upper arm. That this difference was not due to decubitus was clearly established by noting the positions in which the exempted arm was placed. The following case is illustrative.

CASE IX.—*Cardiac Dropsy in a Man aged 40. Decubitus on the Left Side. Inhibition of Anasarca in Left Arm.*

John N., aged 40, was admitted into Ward I., Edinburgh Royal Infirmary, on 24th October 1862. After exposure to cold, hardship, and habitual drunkenness, he had palpitation, orthopnoea, and other cardiac symptoms. On admission a loud whining murmur was heard at base with the second sound, at a point between the second and third ribs, and a double murmur at apex. After a long illness general anasarca was established, with traces of albumen

in the urine. Decubitus was commonly on the left side. The scrotum and prepuce and legs were equally anasarcaous, but the arms were not, for on measurement, on 13th December (the urine amounting to 64 ounces per diem), the right wrist measured $8\frac{1}{2}$ inches round, the left only 7; the right palm was 6 inches, the left only 5; and this disproportion continued all the way up the arms. Yet the patient had constantly his left arm the most dependent. After death, on 11th January 1863, it was found that he had had adherent pericardium and mitral and aortic disease. The whining murmur was caused by a tongue-like prolongation into the aortic orifice, and the aorta was very atheromatous.

The complication of cilio-spinal neurosis ("Graves' disease") with anasarca is perhaps less rare than it appears to be, from defective observation. A case has, however, been reported by Dr Wm. Moore, in which there was exophthalmic bronchocele, with œdema and dropsical effusion.¹ In a certain class of cases the anasarca shows itself in the first instance, and exclusively, in the region of præcordial vascularity (*see ante*, p. 7), constituting præcordial œdema. This was seen in two instances (of females) in the Infirmary, under treatment during the past trimestre. In both, the first intimation of any disorder of the health was given by the feeling of tightness of the clothing in that region, and when there was as yet no swelling elsewhere. Both cases were examples of so-called "acute Bright's disease;" but although the urine was loaded with albumen, no tubecasts were observed, and in both the pulmonary symptoms were the most pressing, evidently from pulmonary œdema.

CENTRIC PULMONARY ŒDEMA AND PLEURAL EFFUSIONS.

How far visceral œdema is necessarily associated as to a common cause, or class of causes, is a very important practical question, for it is this kind of dropsy which usually terminates life. In all the fatal cases of differential œdema I have related, it is noteworthy that it coincided with disease of the thoracic viscera, but more especially of the heart and pericardium. Dr Watson observes, as to pleurisy, that when the effusion is great, that side of the thorax in which it has taken place is more or less dilated, and "that the integuments on the same side are frequently œdematous."²

How far in these cases there is obstructive pressure on veins and gravitating œdema must be determined by observation. In Case I. the left pleura was the first and chief seat of effusion, coincidentally with anasarca of the left arm and left side of the thorax, and I have also observed that œdema of the lungs follows the same law. It is probable that the so-called effusive pleurisies, in which there is also a violent intercostal neuralgia, are really examples of nervous dropsies, for in these an œdema of the corresponding side has been observed. And a difficulty as to the nature and meaning of pain in pleurisy can be cleared up by this view. It is well known how often the seat and extent of the inflammation has no relation to the seat of

¹ Dublin Med. Press, 15th April 1863.

² Lectures on Practice of Physic, 4th Edition, vol. ii. p. 123.

pain; so much so, that cases are occasionally met with in which the pain is on one side and the inflammatory changes on the other, just as in Case I. the hyperæsthesia was at the opposite side to the pleural effusion. Assuming the cause of pain to be centric, the side to which the pain will be referred will depend upon the seat of the centric lesion and the sensory fibrils involved. If it be on the same side as the pleural affection, and the decussating sensory fibrils be involved, then the resulting pain and hyperæsthesia will be referred to the opposite side.

In cardiac affections of a rheumatic character, with rheumatic pain in the left arm, and in angina pectoris, it seems certain that the corresponding half of the spinal cord is affected, and that when both arms become the seat of neuralgiæ, as sometimes occurs in breast-pang, it is because the spinal affection has extended to the other half. But even in these cases the law of decussation of the sensory nerve-fibrils may determine the seat of pain; in which case the spinal affection will be on the opposite side.

CENTRIC DIAGONAL ANASARCAS OF THE LIMBS.

As illustrating what particular portion of the nervous system is involved and how, I would call attention to a class of œdemas which may be termed the *diagonal*. In some cases the effusion is limited to the thigh and hip of one extremity, and the leg and foot of the other; in others to the legs below the knee, and the arms below the elbow; in others to the thighs, the legs being free; in others the whole upper extremity is anasarca on one side, and the whole lower extremity on the other. The subjoined case is illustrative of this form.

CASE X.—*Dropsy in a Man aged 30. Signs of Cardiac Disease; Capillary Bronchitis and Fibroid Degeneration of Lungs; Probable Œdema of Right Lung. No Albuminuria. Diagonal Anasarca.*

Robert F., aged 30, a railway labourer, came under my care on 10th March 1863. He was in a very weak state, and had great dyspnoea, incessant cough, and copious frothy muco-purulent sputum of a fetid odour. The face was very livid, the eyelids and thorax œdematous. He had moist sounds very generally over both lungs, but predominantly over the right. Decubitus on the right side, on which side the thorax was most œdematous, probably from gravitation. Tubular breathing and blowing murmur at base were noted, but the state of the patient did not allow of careful physical examination. No albuminuria. The œdema was differentiated in a remarkable manner, for while the right side of the thorax was œdematous, with decubitus on that side, the right arm was free; and while there was œdema of the left arm, which was uppermost, the left side of the thorax was free. Further, while the right leg, foot, and thigh were very anasarca, the left extremity was free, except the foot, which was very œdematous. The eyelids were both œdematous. He died nine days after admission, with little change in the differential distribution of the fluid.

The restriction of the œdema to the legs, the thighs not being affected, is usually referred to gravitation. Without denying (what

must be obvious to all) that when the fluid *is* effused it must necessarily gravitate to the most dependent point, it is more than doubtful whether the effusion itself (which is a wholly different process—is *the* process in fact) is due simply to gravitation. Dominic D., aged 47, was affected with acute anasarca, tube-casts, and albuminuria. He had in the first instance œdema of the eyelids and face, then the scrotum was involved, and, lastly, the legs below the knee became exceedingly anasarcaous; yet the thighs were not affected, the effusion being bounded by the knees. So also purpura will be restricted to the forearms and the legs. Alexander M., aged 47, with Bright's disease, had œdema of both legs, not extending to the thighs or genitals, slight thoracic œdema, and œdema of the eyelids, forearms, and hands, but not of the upper arms. He was affected with purpura, but the spots were restricted to the legs below the knee, and to the right eyelid, affected just before death.

None of the current theories of dropsy help in any degree to explain facts like these, but certain phenomena referable to the nervous system are available. I would particularly refer the reader to Dr Roberts' instructive monograph on Wasting Palsy, for cases in which the muscular atrophy of the limbs followed almost exactly the same order as the dropsical effusions and inhibitions in these cases. For example, the legs are unaffected when the thighs were wasted, and so with the forearm and upper arm. In a table of 105 cases, the restriction of the atrophy to groups of muscles, and therefore to special centres of innervation, is very striking.¹ An additional fact of the same kind is contained in a communication recently addressed by Professor Remak to the Medical Society of Berlin, in which he describes a case of "*Spasmus alternans transversus*," so named because this diagonal or crossed manifestation of phenomena was observed. For example, the muscles of the left upper arm and of the right hip were spasmodically affected at the same time. Some of those who have observed cases of wasting palsy (and Dr Roberts is one of them), finding it difficult to explain the nervous origin of the disease by current doctrines, have come to the conclusion that it is not due to disease of the spinal cord, nor of the motor nerves, either at their exits from the cord (roots) or at their peripheral terminations in the muscles. The difficulties disappear, however, if the affection be referred to a tropical nervous system, as distinct from the sensory, volitional, and visceral, and having, like those systems, restricted centres and areas of action. I have elsewhere discussed the question of restricted areas of innervation, as manifested in limbs and in groups of muscles, and to this work I beg to refer.² I may add, however, that some experiments made by M. Schiff strongly support the spinal origin of wasting

¹ On Wasting Palsy, p. 74.

² Mind and Brain: or, the Correlations of Consciousness and Organization, vol. ii. part vi. chap. v.—Organology of the Spinal Cord, and especially § 972, p. 419, *et seq.*

palsy, for he found, on making hemisections of the spinal cord, that there was a diagonal production of heat in the limbs. For example, the same section induced increased heat in the thigh of one lower extremity and the leg of the other.¹

Reserving, however, the consideration of these and other points in the history of dropsies, I would submit that the foregoing cases abundantly prove, 1. That the nervous system as a whole, or else some special division of it, has a direct influence both on the production and prevention of anasarca. 2. That anasarca is produced when innervation is defective. 3. That anasarca is prevented being manifested locally when the general causes are in operation, by more vigorous because more healthy innervation of the exempted tissues. 4. That centric disease or disorder may have the double effect of facilitating the effusion in one lateral portion of the body, and preventing it in the other lateral portion. 5. That production or prevention alike follow upon changes in innervation, which are induced in the same way, and according to the same laws, as other neuroses; and, finally, 6. That it is not the sensory, motor, or vasomotor systems which are specially involved.

The influence of the portion of the nervous system involved in dropsies upon the means and methods of successful treatment will have a separate consideration.

II. DIATHETIC TISSUE-CHANGES IN DROPSIES.

IN the preceding histories and comments I have chiefly restricted myself to a demonstration of the fact that the nervous system exercises an important influence both directly and reflexly in producing and preventing dropsies and dropsical effusions. It is hardly necessary to remark that such influence can only take effect under appropriate conditions; for multitudes of nervous diseases occur without any dropsy supervening. The same point has been already considered in reference to all those causes of dropsies usually alleged, whether humoral, congestive, or hydrostatic, and which are admissibly predisposing causes. It is necessary, then, to the better understanding of dropsies, that an inquiry be made into another element, namely, the state of the affected tissues themselves, as shown by clinical observation, so as to determine what is the true relation of those tissues to the nervous system, to morbid states of the blood, to the heart, and to the causes generally of dropsies.

To comprehend what occurs in the tissues in cases of dropsy, it is necessary to bring the method of analogical inquiry into use, and determine thereby how far the general laws of degeneration of nutrition are applicable, and to what extent they are manifested in dropsical effusions. The following are some of the anatomical changes and clinical phenomena associated more or less with

¹ Comptes Rendus, tom. 55, p. 426, sqq.

dropsies:—1. Purpura in all forms, and both acute and chronic; 2. Diathetic and metastatic irritations and inflammations, chiefly known as the rheumatic and gouty; 3. Certain fatty, fibrinous, and plastic exudations and degenerations, comprised under the terms fibroid, amyloid or waxy, atheromatous, syphilitic, and leprous, of which the capillaries and small arteries are chiefly the seat; 4. Variations in temperature, due to both centric and reflex influences of the nervous system; 5. Congestions and congestive inflammations and effusions of a symmetrical character, or directly associated with changes in the nervous system; and, 6. Serous fluxes from mucous surfaces dependent on nerve-lesions, of which a nervous albuminuria is the type (see p. 14). As to all these (and others), they are found in connexion with dropsies, and are so intimately associated in many cases with changes in the nervous system, that I have found it convenient in teaching to class them and others together as a distinct group of neuroses or nervous affections, in which disordered nutrition of the tissues is chiefly manifested, and have termed them *Trophesicæ*.¹ Some of them will be most conveniently considered in their relations to the nervous system exclusively, but others in relation to the tissue-changes in dropsies.

Purpura and Dropsies.—In a proportion of cases of general dropsy, purpura is manifested. It is usually attributed to a depraved condition of the blood like that of scorbutus, induced by albuminuria, unsuitable diet, and the like. There are cases, however, to which this theory does not apply, and in which the purpura probably arises from the same causes as the dropsy, with a difference in the condition of the red corpuscles. The following case serves to illustrate this fact:—

CASE XI.—*Paraplegic Œdema and Purpura in a Girl aged 18; no Albuminuria, nor Cardiac or Pulmonary Disease; Nervousness and Nervous Palpitations; Pigmentation of the Face. Successful Treatment by Nervine Tonics.*

Jane U., aged 18, a house and table maid, was recommended to my care by Dr Wilson of Alloa, on 28th July 1865. She was pale, with dark hair, and of small stature. Very collected and intelligent in her manner. She had no cough or palpitation, and no signs of disease of the heart or lungs. Tongue moderately clean; appetite good; legs œdematous, and covered fairly with spots as far as the knees, which are red, pale-red, and purplish, not raised, and varying in size from that of a pin's-head to a millet-seed,—one or two as large as a small pea. She said that previously to the New-year she had occasional fits of vomiting, and had to take medicine for them; was very nervous, and easily startled, and often experienced violent palpitation of the heart, beatings in the neck, and a strong pulsation at the pit of the stomach. She had had no swelling of the neck; but when the palpitation was very violent she became very dark in her complexion, just as if she had been exposed to the sun. Five weeks ago, she had very violent pain in the abdomen "all over it," and weakness and pain in the back. Shortly after, her legs began to swell, and purple spots broke out, especially after standing much. Similar spots

¹ See my "Principles and Methods of Medical Observation and Research," 2d Edition, pp. 342, 344.

appeared also on her arms whenever she had any extra weight to carry, or a strain was put upon them. The dropsical swelling extended as high as her hips, and sometimes the spots appeared on the thighs. The legs always felt cold and somewhat numb, but were sore to touch. Had lived in an English family, and had always plenty of excellent food. No constipation. Catamenia copious, recurring every two or three weeks. Had to strain to pass urine, and was sometimes unable to do so until she had sat over hot water. The urine was not copious; contained no albumen. The case was diagnosed as a uterine neurosis, and a pill prescribed to be taken three times a-day, consisting of valerianate of iron, gr. ij.; extract of nux vomica, gr. $\frac{1}{8}$; extract of chamomile, gr. iij.

Dr Wilson kindly reported to me the result of treatment as follows:—“Within a week after taking the medicine prescribed, a great improvement took place in her condition. The great uneasiness, or rather pain and œdema of the legs that she complained of began to diminish, and at length disappeared, leaving her in her ordinary state of health. About a month since, her mother asked me if I could give her a prescription for the same pills, as she had lost the original, and the girl was afraid the swelling was returning. I called to-day and learned that she was in the enjoyment of excellent health.”

A pigmentation of the face, but more especially of the eyelids, is not uncommon in women of nervous and rheumatic habits; and it is probable that the purple eruption in this case was the same as that termed many years ago by Schönlein *Peliosis rheumatica*. To this kind belongs also the purpura occasionally seen in pregnant women and in anomalous hysteria. There seems to be little doubt that a certain class of cases of acute *purpura hæmorrhagica* are of rheumatic origin. Dr Parkes has very clearly elucidated this point in its pathology.¹ The attacks of purpura and hæmorrhage to which the persons termed “bleeders” are constitutionally subject, are also intimately associated with rheumatic symptoms and tendencies; and in these and other cases the so-called “molimen hæmorrhagicum” is accompanied by nervous phenomena. But purpura may be directly induced by emotions. In June 1856, Dr T. Ogier Ward communicated cases in which it came on after a fright. One was that of a female child, aged 4 years, who had been extremely alarmed by being punished at school. The spots appeared on the fourth day after, and she died on the seventh, convulsed and comatose, from effusion of blood into the ventricles. The other was a boy, frightened by a horse that attacked him as he passed through a field. He bled immediately from the nose; and on undressing him at night he was found to be covered with purple spots and patches. It may be local from the same cause. Mr A. M. Edwards sent to me a case of chorea induced by fright, in which the right arm became affected with a sort of purpura lividity. Dr Seymour relates, in one of his published clinical lectures, the case of a woman far advanced in pregnancy, who experienced a dangerous attack of purpura immediately after a fright. Purpura of the legs has assumed the form of a quotidian intermittent. I have a note of a paroxysmal purpura in a girl of

¹ Two Cases of Purpura, with Analysis of the Blood.—Lond. Med. Gazette, Nov. 1848.

17, recurring every seven days. Like rheumatism, purpura is also metastatic, both in ordinary forms, in persons of a rheumatic habit, and in the so-called bleeders.

The pathology of purpura is doubtless very complex, but these facts abundantly prove that the state of the nervous system is an important element in causation; and there seems little reason to doubt that both the capillaries and the blood-corpuscles are also involved. We are indebted, however, to Dr Wilson Fox for researches into the tissue-changes peculiar to purpura, in the case of a man suffering at the same time from syphilis and complicated with œdema, in whom a syphilitic eruption (ecthymatous and vesicular) was apparently the determining cause of the purpura. The œdema of the limbs was brawny, except above the ankles; the scrotum œdematous. After death, waxy degeneration of the smaller arteries and capillaries of the parts affected was found. The muscular fibres of some of the muscles had also undergone a similar degeneration, and those of the heart were in a few parts waxy, but in the affected spots the more general appearance was, that the fibres were finely granular, with indistinctness of the transverse striation.¹

The intimate relation between dropsies and rheumatic and syphilitic degenerations (very clearly shown in the cases I have related) has led me to suspect that in the former there is a degeneration of the capillaries as the proximate or essential cause, and I have had microscopic investigations made accordingly, but hitherto without result. Nevertheless, I still think careful microscopic research will prove that in dropsy, as in purpura and certain kinds of albuminuria, there is a structural degeneration of the vessels. It is no argument against these conclusions that purpura is, in the case related by Dr Fox and others, too acute a disease. As to this point, our opinions are wholly *à priori*, and founded solely upon experience as to chronic degenerations only. But there is no reason why these changes should not be as acute as those of ordinary inflammations; and it is certain as a fact, according to my experience, that fatty degeneration of the muscles, smaller vessels, and capillaries, is sometimes as idiopathic, acute, and self-limited as the changes in the joints in acute rheumatism. Fatty degeneration of the heart is sometimes very rapid.

The case of Dr Wilson Fox illustrates another point in the pathology of dropsical effusions and their affinities to purpura, namely, the influence of certain specific poisons in inducing them. As a fact of experience, the complication of purpura with rubeola, variola, and scarlatina is admitted; but the relation it bears to the dropsy which sometimes accompanies or follows those fevers is not so obvious. In the consequences of inoculation by septic poisons, like that of erysipelas, or by the venom of snakes, the conjoined

¹ Case of Fatal Purpura associated with Waxy Degeneration of the Striated Muscles, and also of the Vessels of the affected Parts.—British and Foreign Med. Chir. Rev., Oct. 1865.

results of œdema and purpura are well shown, together or separately, the blood and capillaries being rapidly disorganized.¹

Hæmaturia is a not unfrequent concomitant of dropsy. The smoky tint of the urine in scarlatinal dropsy is due to blood-corpuscles; in chronic cases the blood may be very abundant (Cases VII. and XII.). The usual explanation of this bleeding is "congestion;" but I think it may be more correctly classed with the hæmorrhagic effusions known as purpura, and is due to nerve-influence. In the case of scarlatina related below there was no hæmaturia, nor was blood found in the urine present in the bladder at death; so that it must have been poured directly into the pelves of the kidneys just before death.

The rapid production of œdema is, however, the more common result, and can only be explained (as is the purpura) by the direct local action of the poison on the tissues, the nerves, the capillaries, and their contained blood. I have seen the leg of a man swell so greatly from the sting of a wasp, that the leg of his trousers had to be ripped up to get it off the limb. The clinical counterpart of both the œdema and the hæmorrhages is to be seen, I think, not only in the ordinary forms of scarlatina with anasarca, but in those also in which hæmorrhagic effusion takes place at a very early stage into the ventricles of the brain, pericardium, pleuræ, pelves of the kidney. A case of this kind occurred to me lately in the Royal Infirmary, which threw considerable light on the nature of the tissue-changes in these cases, and in which they were very similar to those observed by Dr Wilson Fox. A man, aged 22, convalescent from exanthematic typhus (in which fatty degeneration of the heart is, I think, a common lesion, and often the cause of death), became affected with scarlatina. It was a smart attack, and the rash was very vivid; but no unusual symptoms were noted nor danger apprehended until the morning of the fourth day of the fever, when he rose to the night-chair and passed a copious bloody stool. He fainted (as it was thought) in consequence, but did not recover from the faint, and shortly died. After death extensive fatty degeneration of the capillaries of the small intestine was found; the pelves of both kidneys were filled with blood, and the serous and mucous tissues generally were reddened as if from sanguinolent infiltration. The condition of the heart seems, however, to have been the immediate cause of death.

¹ The following illustrates the action of snake-venom:—"No sooner had these refractory animals (horses) abandoned the secure pastures for the high grounds than, attacked by snakes, one of them was brought staggering into camp, groaning piteously. A light was speedily procured, when a most revolting spectacle presented itself: the poor beast,—so covered with blood that he appeared literally to have been plunged into a bath of gore,—had evidently been bitten by a snake. . . . So that the venom had not power to produce immediate death, but effected a complete diapedesis or effusion of blood. The horse in a short time expired, evidently in great agony."—Wild Scenes in South America, by Don Ramon Paez, p. 291.

In the recent state, the ventricular muscular fibres broke down so readily into fragments, that it was difficult to obtain anything like a satisfactory view of their sarcois contents, and their softened readily disintegrating condition gave the impression of very extensive disorganization of the contractile substance. The liver was very fatty, and the hepatic juice contained free oil globules. These were also found abundantly in the blood.

Rheumatic and Gouty Degenerations and Dropsies.—The relations of dropsies to purpura, and of purpura to rheumatic affections, just shown, naturally suggest an explanation of the connexion observed between cardiac diseases of a rheumatic character and dropsies, founded on the doctrine of community of tissue-change. As this question is too extensive for discussion now, I would merely refer to the theory as offering a more satisfactory explanation than those of mechanical obstruction usually accepted and taught (see p. 10). For, by taking as our guide the established fact, that in all these chronic cases of general dropsy there is a degeneration of the smaller tubes, including the capillary bronchi and air-cells, as well as the bloodvessels, we are led directly to the conclusion that some general, constitutional, or diathetic cause, or class of causes, is inducing the tissue-changes. In rheumatic degeneration (speaking generally) the tissue-change is fibroid,—in gouty, atheromatous; but in both there appears to be a preliminary and predisposent stage of defective tone of the vessels, due, in some cases at least, to defective innervation. And not only is this practically the reason why certain localities are preferentially the seat of rheumatic or gouty change, whether acute or chronic in the first instance, but also why metastasis occurs. For if the explanation as to the prevention or removal of anasarca (“serous metastasis,” see p. 13) be applied to the tissue-changes of rheumatism, we can clearly see that an inhibitory condition of the nervous system will cause the cessation of the local phenomena, while the productive condition arising at the same time will induce them elsewhere. Thus, the states of the nervous system in metastatic cases of rheumatism afford a simple and sufficient explanation of the phenomenon without dragging in a lumbering humoral doctrine. Further, particular conditions of the nervous system and of particular organs will modify the tissues in dropsies and dropsical effusions, just as in rheumatism. The differences of age and sex, of employment, the portion of the nervous system affected, the state of the uterus and ovaria during menstruation and pregnancy (in which both the blood and nervous system are involved), and the consequences resulting from rheumatic diseases of the liver, lungs, kidneys, heart, must all exercise a direct modifying influence. From this more general point of view, the acute anasarca, which comes on after “taking cold” in rheumatic subjects, may be held to take the place of the articular affections in others, and that, consequently, in such as

Cases I., II., V., IX., of cardiac dropsy, the pericarditis and anasarca may be looked upon as alike due to a common cause or class of causes. In like manner, the anasarca after scarlatina and the articular affections, which often both accompany and follow that fever, are of common origin. In all these forms there are the two chief elements of disease,—defective tissue-change, and defective innervation.

Syphilitic Degenerations and Dropsies.—The same doctrines illustrate the close relations between the syphilitic taint and dropsies. I am not aware how far these have been noted and recorded, but certainly Cases IV., VI., VII., illustrate a very common class of dropsies connected with syphilis. The waxy degeneration of the smaller vessels in syphilitic Bright's disease is only an illustration of what takes place elsewhere when the determining and localizing causes of syphilitic degeneration take effect. The difference between the syphilitic, gouty, and rheumatic degenerations respectively, is not, in fact, in the class of tissues affected, nor in the innervation, but in the particular kind of tissue-change. In the first there is "gummy deposit;" in the second, atheromatous change; in the third, fibroid or fibrinous degeneration; but in all a debility or defect of function, and of the same class of tissues. This fact, in the clinical history of dropsies, plainly points to the necessity of a diathetic method of treatment appropriate to each kind of dropsy, considered as a constitutional affection. The connexion of syphilis and purpura is little recognised. In the case of Dr Wilson Fox, quoted above, a good illustration of this is afforded. The condition of the syphilitic skin probably predisposes. A man, who had just entered the Infirmary to be under the care of the late Professor Miller for syphilis, was sent to the skin ward to be under my care, with an eruption which proved to be variolous. He died with purpura hæmorrhagica, and on inquiry it was found to be the second attack of smallpox he had experienced in six months. Unfortunately, it did not occur to me at the time to have the cutaneous tissues and capillaries examined microscopically; but more recent researches show that these undergo a peculiar change in constitutional syphilis. A woman under my care in the Royal Infirmary, suffering from phthisis and purulent bronchitis, died suddenly from apparently the sudden failure of a weak fatty heart. She had syphilis, and her skin presented isolated slightly elevated circular patches of a tawny colour, rough and cracked on the surface, and without hairs or scales. Dr Smart (my then class-assistant) examined these patches microscopically, and found that they retained their circular form through the entire thickness of the derma. The outlines of the sweat and sebaceous glands and hair-follicles were distinctly visible, but their proper substance was entirely altered by the presence of a fibrous tissue dependent on hypertrophous degeneration of the proper white fibrous tissue of the derma. Bloodvessels, nerves,

basement membranes, were replaced by fusiform nucleated fibrous tissue, which extended inward towards the adipose cells a line or two farther than the healthy tissue. The elevated appearance of the patches was due to the growth of the same kind of tissue. The change may be termed a cirrhosis or fibroid degeneration of the skin.

Congenital dropsy is sometimes observed in the newly born infant. Its causes are not known, but it may be referred to these diathetic states. Mr Burton has recorded two cases of infants born in succession of the same mother, affected at birth with ascites and universal anasarca. Dr Wilks made a post-mortem examination of the second infant, but found nothing amiss with any of the viscera, nor any obstruction in the arteries of the umbilical cord. The placenta, too, was healthy.¹

Anatomy of Œdema as a Tissue-Change.—The varieties in diathetic degeneration just described seem to be associated with corresponding differences in the constitution of the accompanying œdema. In cardiac dropsies of rheumatic origin, it seems to be of a more brawny character than in renal dropsies, and if (as M. Becquerel has shown) the effused fluid contains more solid matter in the former than in acute Bright's disease, and in the latter more than in the chronic kind, the difference is probably due, in part at least, to differences in the condition of the blood. But the tissue into which the effusion takes place must also make a difference in the solidity and resistance of the œdema. In renal dropsies it is chiefly, I think, into the subcutaneous cellular tissue; in the cardiac and rheumatic forms, more into the muscular tissue. This is plainly shown by the effects of incisions and punctures of dropsical limbs, which are always more useful, according to my experience, in the doughy renal anasarca. Probably, in many cases, both kinds of tissues are the seat. In a case of cardiac and renal dropsy I had examined after death, the œdema appeared to affect the derma but slightly, but the subjacent tissues were in a state of sponge-like infiltration. The connective and cellular tissues were somewhat on the stretch from simple distention, and the interspaces occupied by fluid. The vascular and muscular tissues were pale and flabby, and the sarcolemma distended by the fluid into little pouches. No change of structure observed.

That the œdema will differ according to the state of the blood, and this according to the diathesis and the class of tissues affected, becomes more probable from a consideration of those kinds of diathetic degeneration which are, at least, closely analogous to brawny œdema,—namely, elephantiasis, or Barbadoes leg, and the tubercular forms of leprosy in which an organized fibrinous effusion seems to constitute the essence of the disease. In both the nervous system is involved,—demonstrably so in leprosy; in both there seems to be a specific cause, and in both the morbid

¹ British Medical Journal, 2d May 1863.

change follows the same order as in ordinary œdemas. Thus, in elephantiasis, the legs and scrotum are most commonly the seat of the effusion. I think that a syphilitic taint, or at least some specific condition of the system as to tissue-change, is also associated with some kinds of brawny œdema. I lately saw a case, in consultation with a medical friend in Yorkshire, in which the legs had been for several years the seat of a brawny œdema to such an extent as to give the appearance of a Barbadoes leg. The father of the patient had syphilis and died of it, and mercurial fumigation benefited the case. The nervous system has also a direct influence on these brawny kinds. I was lately consulted as to the health of an English lady, who two years previously was suddenly awakened from sleep to see her infant streaming with blood. She immediately lost consciousness, and on being restored to it, her right side was found to be hemiplegic. When I saw her the face was slightly distorted, and on the palsied side was a foul ulcer. On close examination, the whole of that side was found to be infiltrated with brawny œdema. She was pregnant at the time, and possibly the state of her blood may have been the cause of the brawny condition. In the obstructive œdema termed phlegmatia dolens, this brawny character is very striking. The same influence of the nervous system was shown in the case of a Scottish gentleman who had been many years in Australia, and was recommended to my care by his eminent London physician. Two years previously he began to have twitchings in the calf of the right leg, with tottering; as it got worse the left leg was affected, and within the last few months the right hand and arm began to shake and experience cramps. He had pain in the nape of the neck, and tenderness on percussion; and on careful examination it was ascertained that the neck and shoulders were the seat of a brawny œdema, chiefly, however, on the right side. When he was first attacked, his face was swelled in like manner. This occurrence of purely local œdemas, in connexion with diathetic degeneration and defective innervation, is also witnessed in syphilitic neurosis of the face, as when the portio dura or trigeminal nerves are palsied. I have had several such cases, in which the œdema was restricted to the palsied region.

General Relations of the Tissue-Changes in Dropsies.—From the foregoing considerations and facts we can draw some practical conclusions as to the relations of the nervous system to the tissues affected with dropsy or dropsical effusion. We can infer that it modifies the tissues:—1. By increasing or diminishing the activity of the capillary circulation, and therewith the supply of blood to them. 2. By functionally increasing or diminishing the retaining property of the capillaries, and thereby facilitating or preventing transudation. 3. By modifying the vital affinities of the capillaries and the blood within them—more especially the corpuscles,—and thus modifying the processes of blood-metamor-

phosis. 4. By so altering the nutrient processes in the capillaries themselves, that structural changes in the capillary textures result, and thus inducing a predisposition to the formation and transudation of albuminous fluid. Such predisposition being established in consequence of defective activity of the nutrient nervous system, dropsical effusions readily take place upon the occurrence of exciting causes, whether they arise in the nervous system itself or otherwise. In other words, there is a local or general affection of the vascular system and the tissues in certain dropsical effusions, together with a local or general affection of the nervous system.

On the side of the blood and tissues may be mentioned as predisposing causes:—1. A diathetic tendency to diseases of the vaso-motor system itself, and of the small vessels. 2. A diathetic tendency actually manifested, as in waxy degeneration and atheroma of the vessels. 3. A tendency to cardiac and vascular diseases, or the actual development of them, as in rheumatic affections. 4. Morbid conditions of the serum and blood-corpuseles, as from profuse hæmorrhages, albuminuria, and albuminous fluxes, or the fibrinous condition (hyperinosis) which coincides with rheumatic and puerperal states, and with which the state of the blood during menstruation and in scorbutus may be classed. 5. Certain general morbid conditions in which there is a general cachectic state of both the blood and tissues, as in the syphilitic, cancerous, leprous, cachexiæ.

On the side of the excretory organs, through the functions of which the due amount of water in the blood is maintained, the kidneys and sudoriparous glands are chiefly involved. All these general morbid conditions may be observed in practice without any anasarca, perhaps as frequently as with it. They are, therefore, insufficient of themselves to induce general dropsy, so long as the aqueous excretions equal the aqueous ingesta. If, however, the cutaneous secretion be suppressed, and then the kidneys fail to excrete urine in proportion to the amount of fluids taken, and no diarrhœa supervene, there is sure to be an accumulation of fluid in the cellular tissue, so that the patient gains weight. And as there is often great thirst in cases in which the renal function fails, the patient drinks more than usual, and becomes rapidly bloated with water. Dropsy from a *plenum* thus caused, is, I think, amongst the established facts of pathology. Nevertheless, the very failure of function in the two organs of aqueous excretion—the skin and kidneys—is not unfrequently due to changes in the tone of the nervous system (which appear to be, in fact, of an inhibitory character), as well as to tissue-changes in the organs themselves.

III. HOW AND WHAT PART OF THE NERVOUS SYSTEM IS INVOLVED.

HAVING determined what part the tissues play in dropsies, we can now the more easily investigate the nature of the changes in the nervous system which influence them, and what part thereof is involved.

As to the nature of the changes in the nervous system, they are distinctly of two kinds, the one favouring dropsical effusion, and therefore essentially morbid, and the other resisting or preventing, and therefore essentially normal. This is true, paradoxical as the statement may appear, of such changes as are plainly morbid, as in Case V. of embolic hemiplegia. For in all the instances I have watched of differential nervous anasarca, the excepted limb became gradually infiltrated as the effusion increased elsewhere and the fatal termination approached, thus showing that the excepted tissues were enabled to hold out longer against the causes which had involved the more dropsical, and indicating the line of inquiry as to treatment.

And that this is the real state of things in a case of general anasarca is probable from other considerations. Certain general morbid states of the nervous system seem to inhibit anasarca generally. It was pertinently asked by my friend Dr Webster, why, if defect in the nervous system be cause of dropsy, are the insane so remarkably exempt from it? Out of 298 autopsies of insane persons recorded by him, only 4 were examples of simple anasarca; 12 were anasarcous, with effusion into the chest and pericardium; while in 23 there were effusions into the thoracic cavity, without any anasarca whatever.¹ Now, these facts—conclusively proving at least that it is not every kind of nervous disorder which induces anasarca—may be held to prove that the state of the nervous system in insanity is in some degree prophylactic against it—is of that morbid kind which is inhibitory. There are reasons for concluding that this condition arises in the course of other diseases of the nervous system. Under any deductions we can understand that the reason why one person gets dropsical with the blood-causes of anasarca in a trifling degree, while it is not manifested at all in others in whom they are strongly operative, rests probably on the different powers of that portion of the nervous system upon which what is termed tone depends, and that in proportion as the tone is lowered locally or generally, the dropsy of the tissue or tissues will be caused or increased.

Further: in several of the cases detailed, two opposite and antagonistic conditions on opposite sides of the body seemed to be dependent upon the same unilateral and centric change—a fact of

¹ Report of Proceedings of Royal Med.-Chir. Society of London, in *Med. Times and Gazette*, and other journals, 13th May 1865.

considerable practical importance. A similar result is shown by experimental researches on the spinal cord, for they prove that when it is divided half through laterally, changes take place in the two halves of the body below the section of an opposite character. 1. On that side of the body corresponding to the section there is increased heat and vascularity and hyperæsthesia. 2. On that side opposite to the section there is diminished heat and sensibility and anæsthesia. It is curious to observe how those who theorize from those facts confine their attention chiefly, if not entirely, to the positive phenomena, and give little if any consideration to the negative. But it is plain that since the two classes of phenomena are due to the same cause, they must be taken together in all theoretical considerations. If, then, in vivisection a lesion of one-half of the cord produces opposite conditions of the circulation in the two halves of the body, the same result should follow in morbid states of the cerebro-spinal axis; so that the same centric change which causes increased vascular activity on one side of the body ought to diminish it on the other. Now, this conclusion is established by a consideration of the cases of differential dropsy detailed.¹

A confirmation of these views is afforded by the fact that this inhibitory action of the nervous system is seen in other forms of disease besides dropsies. For example, section of the sympathetic or spinal cord on one side is followed by increase of sweat on the same side if not by diminution on the other. Now, as suppressed perspiration is one of the chief exciting and aggravating causes of dropsies, while diaphoresis is one of the efficient means of relief, it is of practical importance to know the reason why. In certain cases, sweats are distinctly symmetrical. I have lately had under observation a case of phthisis, in which the profuse phthisical sweats did not occur on the left arm and left side of the thorax, while all the rest of the body was bathed in perspiration. They were evidently inhibited in the same way as the œdema in cases of general anasarca (Cases II., III., IX., X.). The following is a case of inhibited perspiration (paraplegic) in a case of diabetes. Edward N., æt. 23, a patient in Ward I., admitted 29th March 1865, to be under my care, received a severe crushing blow on the lumbar region two years previously, whereupon his health failed, and he suffered from diabetes mellitus. On admission the patient was found to pass 200 oz. of urine daily, of sp. gr. 1040, and containing sugar. He sweated at night very much, but the perspiration was limited to the upper half of the body above the umbilicus,

¹ These remarks apply exclusively to the results of hemicentric lesion upon the body, or those parts supplied with nerves from the seat of lesion. When the nerve-centres themselves are affected, then the lesion may have quite different results. Thus, injury to the external convolution of the left frontal lobe is so constantly followed by speech-palsy (aphasia), that it is concluded the organ of language is unilateral; whereas the fact only proves to my mind that the lesion on the left side, while it effectually stops the function there mechanically, also stops it on the opposite side dynamically by decussating inhibitory action.

—all below that point was quite dry, so that diaphoresis there was inhibited. That there was some paraplegic condition was manifest, although the only signs of lesion were pains in the joints and a feeling of fatigue in the calves. The hands and forearms were also quite dry. He had *muscæ volitantes*, and objects appeared to be twice their natural size. There are also both hemiplegic and paraplegic sweats in fevers. Often, as in phthisis, the sweats in intermittents are limited to the head. "A young man who had been hemiplegic on the left side from infancy came into hospital suffering from a tertian. He sweated on that side only which was not palsied. He assured us that he never sweated except on that one side—the arm, leg, neck, and side of face. In another case of tertian, the sweating was always limited to the two legs, where it was very profuse. Immediately above the knees the skin resumed at once (*brusquement*) the dry condition."¹ This latter limitation is of very common occurrence in œdema, wasting palsy, spinal neuralgia, etc.

There are cases on record in which the entire series of phenomena of an ague were limited to one-half of the body, or to a limb, and evidently by inhibitory influence of the nervous system in those parts which were free.² Still more instructive are those instances of hemiplegic eruption in cases of measles and scarlatina in which the cutaneous inflammation is limited to one-half of the body, and for which the most satisfactory explanation is to be found in the law of antagonistic nervous production and inhibition. "Retrocession" of the eruption can also be explained in the same way. And it would appear, too, that in those cases in which there is no eruption, and yet a proclivity to anasarca, the two conditions are really in close relation to each other, through a common cause having its origin in the state of the nervous system of the individual.

It is, doubtless, a very natural inference from all these considerations that it is the sympathetic or vaso-motor system which is involved in dropsies. Thus, Professor Claude Bernard found galvanism to inhibit the functions of the sympathetic branches of the salivary glands in dogs, and arrest the secretion as well as the circulation. There are, however, considerations which would make us hesitate to adopt so restricted a theory; but chiefly I would mention this, that these dropsical effusions result from changes in the nerves and nerve-centres, which are not manifested by the ordinary signs of vaso-motor, motor, or sensory neuroses, but by changes in the blood and the capillaries, which latter are really modifications of nutrition, and belong, therefore, to the processes of vegetative life. Now, these go on in all organisms, independently of

¹ Andral, *Clinique Médicale*, vol. i. p. 477 (*Fièvres*).

² The case of Mary W., in *Boston Med. and Surg. Journal*, 15th Nov. 1855, is a recent example of this. The ague fit was restricted to the right half of the body. In a case related in the *Ephemer. Med. de Montpellier*, the left side was attacked in a female otherwise healthy, aged 22. Others are recorded.

a nervous system ; so that the function of that system is but to direct and regulate them. Such an element of the nervous system must necessarily underlie all the others, and from the nature of its functions may be rightly termed trophical. To these belong the regulation of the temperature of the body, attributed by many to the vaso-motor system, the proper function of which is to regulate the distribution of the nutrient fluid. It by no means follows that because there are coincidentally heat and vascular activity developed in tissues after section of the portion of the sympathetic in relation with them, that that is the cause of the heat. On the contrary, as I have already shown in this Journal (July 1863), the heat is just as probably the cause of the vascular activity. It is, in fact, when both innervation and circulation are most defective, that, under certain conditions of the tissues, heat is most abundantly produced, as in the corpses of persons dead of yellow fever and the cholera. In dropsies the temperature is usually low, but not always ; but, whether or no, it is probably regulated by the condition of both the tissues and the trophical system.

Whether this trophical system has an influence on the production of water in the body, or even on the combustion of it, is a question not to be altogether neglected in investigating the pathology of dropsies. Water is produced apparently in vital processes, and not a few observations have been made and recorded as to the production of water in the body, in cases of diabetes, but their accuracy has been questioned. It is, doubtless, difficult to watch a diabetic patient sufficiently closely, and the fact may be at least held in doubt. But then, on the other hand, if, as Dr Parkes has shown, more water is taken in in fevers than can be accounted for by the excretions, what becomes of it, unless it is burnt up in the body ?

I would not, however, be understood as excluding the other elements of the nervous system from all share in causation. The sensory portion has manifestly important relations to all these tissue-changes, and the cerebro-spinal, vaso-motor, and sympathetic do in some way exercise a direct action on the nutrition of the tissues in dropsies, and on the changes in the blood and the capillaries. Such a system as the trophical must, from its very functions, be co-extensive with the whole, and include the whole nervous system ; so that, although the volitional, motor, and sensory nerves be not primarily involved, disorders of motion and sensation may help us to conclusions as to the seat of centric derangements. Now, in hemisections of the spinal cord, it is observed that there is anæsthesia of the opposite side, and hyperæsthesia of the same side. This is explained by the fact that the sensory nerves decussate all the way up, so that lateral section at one side cuts the sensory fibrils of the opposite side, whereas it only excites that centric exaltation of sensibility in the afferent or sensory nerves of the same side, which any irritants are apt to do. In these cases it seems probable, from Dr B.-Séguard's experiments, that the oxygen of

the air is the irritant. But Dr Séquard has also shown that hemisection higher up, as, for example, at the level of the *corpora restiformia*, excites hyperæsthesia on the same side as the injury. These facts help us, then, to a conclusion as to the seat of the lesion in cases of anasarca. In Case I., the hyperæsthesia being on the side opposite to the anasarca, the seat of the lesion was encephalic, and in the medulla oblongata. The morbid mental state seems to confirm the conclusion. But in the cases in which the œdema was on the same side as the hyperæsthesia, the lesion was spinal; and the absence of all mental symptoms confirm the conclusion. In Case III., the encephalic lesions (apoplexy) were consecutive to the hyperæsthesia and œdema. Case IV. was manifestly of spinal origin, and we may fairly infer from the symptoms that the right half of the "oculo-spinal" region of the cord upwards was involved.

Much might be learned by an inquiry into the causes of dropsies which affect innervation. I shall only say here, however, that anything which depresses the powers of the nervous system, and in particular which involves its nutrition, is a certain cause of dropsy when the other conditions coincide. Thus, grief and anxiety, bodily fatigue, exposure to cold, all induce dropsy by thus acting.

IV. THE TREATMENT OF DROPSIES.

It necessarily follows from the preceding considerations, that in the treatment of a case of general dropsy, regard must be had to the condition of at least the nervous system, the blood, the tissues affected, and the organs which eliminate water—chiefly the skin and the kidneys. And, in accordance with current ideas of therapeutics, we should have to select corresponding remedies, namely, nervines, analeptics, alteratives, and diaphoretics and diuretics, including hydragogue cathartics. But it would help us little if we were to take results only for comparison, and not the process by which the results follow, because a nervine may be both diuretic and alterative,—an alterative both nervine and diuretic. To attain to anything like a clear view of the best remedies for any particular case, we must, therefore, abandon the old empirical method.

Alteratives as Diuretics.—There is a class of remedies which, because of their uses in diathetic diseases, like rheumatism, gout, syphilis, may be termed diathetic alteratives. Such have been in constant use in dropsies under the name of diuretics. An important group includes liquor potassæ, and the acetate, citrate, bitartrate, carbonate, and nitrate of potass; and in a less degree salts of soda, specially the carbonates and phosphates. It is an obvious conclusion that, as these alkalines have been found useful in gouty and rheumatic affections, they may influence the renal excretion, the blood, and the dropsical tissues, in virtue of a similar *modus operandi*, and thus *drugs which, as to their effect are diuretics, are*

as to their mode of action alteratives. This generalization is rendered more probable by extending its application. Thus, lemon juice is a valuable remedy in certain kinds of acute rheumatism and rheumatic gout; it has been found equally effectual in dropsy and dropsical affections, proving a powerful diuretic in doses of a table-spoonful or more three times a-day.¹ I do not enter at all into the therapeutical theories according to which these remedies have been prescribed, preferring to compare the results of experience in their use, and to note the practical conclusion that in dropsies of rheumatic origin, or occurring in rheumatic and gouty subjects, the remedies for gout and rheumatism are found useful. The iodide of potassium has also been found a valuable diuretic, but more particularly in dropsies of syphilitic subjects, and probably because it is really the most reliable alterative in syphilitic degenerations generally. *Mercurials*, in combination with other remedies, have been used as diuretics, as in Dr Baillie's formula of blue pill, with squills and digitalis. Dr Pereira prescribed from ʒss. to ʒj. of the solution of corrosive sublimate to be taken every six hours, with great benefit in cardiac and other so-called obstructive dropsies. Probably mercurials would be most useful in syphilitic dropsies. *Arsenic* has been administered in dropsy with advantage, and as it is an established remedy for certain forms of rheumatic gout, leprosy, and fevers (malarious), ending in anasarca and ascites, it is probably a diathetic alterative in dropsies. It has, however, a direct action on the nervous system, as in chorea, neuralgia, epilepsy; so that it is to be classed with the vascular nervines.

Antimony may be classed with arsenic and mercurial drugs as to its chemical nature, but it seems to act more directly on the heart and vascular system, rapidly lowering the pulse. It is undoubtedly of great value in the acute anasarca, especially when conjoined with the hot-air bath; the effusion disappearing rapidly under the combination. In articular dropsies it is also useful. In combination with opium, or even alone, it is, like digitalis, a very valuable remedy in delirium not of inflammatory origin. We may, therefore, conclude that it acts on the vascular system.

Nervines as Diuretics.—There are two groups of vegetable remedies in dropsies which act on the nervous system; the one being used as diuretics, the other as hydragogue cathartics. To the former belong tobacco, digitalis, squill, senega, and colchicum.

¹ Apple juice has been administered with the same good results. There is a history on record of a man who was so anasarcaous that the cuticle of his thighs and legs cracked from distention. He had also an insatiable thirst, and as the season for cider-making arrived when he was reduced to the greatest state of distress, the idea of drinking new cider became so exquisitely pleasing to him, that, considering his case to be quite desperate, the people about him gave it to him *ad libitum*. He accordingly drank it mixed with water, seldom to the extent of less than five or six quarts a-day. In consequence he discharged eight or nine quarts of urine in twelve hours, and continued to do so until he was radically cured.—“Several Extraordinary Instances of the Cure of the Dropsy collected by Geo. Baker, M.D.” (two other like cases are noted), in *Medical Trans.*, vol. ii. pp. 242, 245.

Digitalis is perhaps the most certain and powerful diuretic in dropsies. It was first used to this end by Withering, nearly a century ago, who found it useful chiefly in those kinds in which the œdema was doughy; in cases in which it was solid and resisting digitalis was of little use. Consequently it is not indicated in the rheumatic dropsies. Withering also observed that it was most useful in cases in which the pulse was feeble and intermitting, but seldom succeeded in those in which it was "tight and cordy." In modern practice it has been found useful as a cardiac tonic, and to this result its diuretic action has been referred, in accordance with the obstructive theory of cardiac dropsies. Sir H. Holland, however, in his interesting and valuable notes on the use of digitalis,¹ suggests that the seeming contradiction in the depressive effects of digitalis on the heart being less manifest in debilitated persons, may be explained by its manner of action on the vascular system, still so imperfectly known, and more recently it is explained that it acts directly on the capillaries of the heart, causing them to contract. Consequently, when they are relaxed, it gives tone and vigour to the heart's action; but, on the contrary, if their contractility be normal, renders it abnormal, and so weakens the heart's action by diminishing the supply of blood to its muscular tissue. The late Dr R. B. Todd laid down a rule for its administration, which has been very generally adopted, viz.:—That it is not to be prescribed in cases in which there is regurgitation, especially aortic. I hesitated long to administer it in a case which I subjoin, in accordance with this rule, but finding all other remedies of no avail, I at last prescribed it with good results.

CASE XII.—*Cardiac Dropsy; Pericarditis (?) ; Anasarca, differential and diagonal; Hæmaturia; Granular Tube-casts. Treatment by Infusion of Digitalis.*

Andrew S., aged 21, a shoemaker, was treated in the Clinical Ward, Royal Infirmary, during the summer of 1865. His mother died of dropsy. Two years previously he had an inflammation of the left lung, when he spat blood profusely. This hæmoptysis recurred from time to time, with great difficulty of breathing, violent cough, and copious expectoration (fibroid lung?). He had palpitation, and a systolic thrill and murmur over the apex. No dropsy or albuminuria. He was readmitted under my care on 20th October, with ascites and general anasarca, loud cardiac murmurs, signs of pulmonary œdema and emphysema, and copious albuminuria with tube casts. The œdema was firm. At first it was observed that the prepuce was œdematous when the scrotum was unaffected; and, although the anasarca was general, there was a diagonal differentiation in the extent to which the limbs were affected. The symptoms became more and more intense, so that by the beginning of January last he had complete orthopnoea; cough very troublesome; expectoration copious and streaked with blood; thirst great; urine 20 oz. per diem, bloody, with much epithelium and fatty and granular casts. A loud rough cardiac systolic murmur heard at both apex and base; transverse dulness greatly increased; apex beat $2\frac{1}{2}$ inches below the nipple. Elaterium, scammony powder, sesquichloride of iron, lytta, secale cornutum, horse-radish spirit with infusion of broom tops and spirits of nitre, acupuncture of legs, dry cupping of loins, hot-air bath,

¹ Medical Notes and Reflections, 3d edition, p. 550.

and antimony, were all tried with no lasting benefit. At the date of January 5, he had gained 49 lb. in weight from dropsical accumulation, and his measurements (taken by Mr Moon, clinical clerk) were as stated below. At that date he was ordered to take ℥ij. of infusion of digitalis every four hours. The urine was more than doubled in quantity in thirty-six hours, perspiration commenced, and on 10th January the measurements were diminished as stated below:—

Measurements of Anasaruous Limbs in Inches in Case of Andrew S.

	Over the Knuckles.		Wrist.		Middle of Forearm.		Ankle.		Calf.		Lower Margin of Patella.		Upper Margin of Patella.		10 inches above the Patella.	
	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.
1866. Jan. 5.	8½	8¼	7½	7¼	9½	9	10	11	16½	15½	15	15½	16½	17½	21½	22
" 15.	8	8	6½	6¾	9	9	14	13½	13½	14	16	16½	20½	20
Diminished in 9 days.	0½	0¼	1	0½	1	2	2½	2	1½	1½	0½	1	1	2

On 5th January the ascites was on a level with the umbilicus. On 15th January the ascites was 3½ inches below the umbilicus.

It will be observed that the right leg and left thigh were the most anasaruous, and *vice versa*, and the right hand and arm more anasaruous than the left. There was a like difference in temperature. On 15th January the right leg at ankle was 87°; left 88¼°; the right leg at thigh was 95°; left 94°. So that the legs and thighs were differentially affected, both as to effusion and temperature. In about four weeks more (on 10th February) the clerk reports, "The limbs are now getting to their natural size. He does not perspire so much; urine pale, sp. gr. 1017, alkaline, no albumen; breathing easier; thirst less."

There could be no doubt that the digitalis alone modified the symptoms so favourably in this case; and although the hypertrophy and regurgitant murmurs seemed to contra-indicate its administration, the patient had rarely to intermit taking it on account of cardiac symptoms. On looking on the comparative measurements it will be seen that generally the limbs most swollen differentially were most rapidly influenced by the drug,—a fact which might lead us to the conclusion that the drug acted on the tissues themselves, and not merely because of the diuresis which followed.

It is obvious that the true *modus operandi* of digitalis has yet to be established; but I think there is no reason for theoretically limiting its action in dropsies, or in hæmoptysis, mania, epilepsy, delirium tremens, and other diseases of the vascular system to the capillaries of the heart: the more obvious conclusion is that it acts upon the capillaries generally and on those of the nerve-centres through the vaso-motor system, and is thus both a nervine and tissue alterant.

Tobacco is closely allied to digitalis in its action, and was first tried extensively in dropsies by Dr Fowler.¹ He seems to have tried it in every form of dropsy,—peritoneal, cardiac, and renal,—with good results. The most marked advantage was shown in un-

¹ Medical Reports on the Effects of Tobacco in the case of Dropsies and Dysuries, 1785, 2d edition, 1788.

complicated cases of ascites. I tried it applied externally to the abdomen in the form of infusion, in conjunction with the internal use of digitalis, in the case of a young girl aged twenty, in whom a distressing ascites came on without any discoverable cause in the liver or peritoneum, so that paracentesis seemed to be indicated. In a few days, however, the fluid diminished rapidly under the treatment mentioned, a copious diuresis being the result.

Colchicum rightly administered is a powerful diuretic. Like digitalis and tobacco it acts upon the heart and the part affected, and is probably, therefore, a vascular nervine. Its well known value in gouty diseases indicates its use in dropsies of gouty subjects. It may be remarked, however, that as to these and other means of cure of dropsy, what is wanted is—not new remedies—but a more thorough knowledge of those we have. Senega, scilla, actæa, guaiacum, ammoniacum, are all of this class. Until we are better acquainted with the best modes of administering our old and well-tried drugs, it is a vain labour to introduce into practice the new and untried.

Hydragogue Cathartics are supposed to operate by eliminating watery fluid from the blood through the intestinal canal, and are prescribed when skin and kidneys fail in their functions. Some of these are powerful nervines, as hellebore, elder, elaterium; others are powerful irritants, as croton oil, camboge, colocynth, scammony. They may, therefore, exercise an influence altogether apart from the mere elimination of water. That irritation of the intestinal canal has a reflex influence on the spinal cord, and through that on the kidneys and affected tissues is, I think, a fact too much overlooked in dropsies. I had a case of chronic dysentery under my care in a man aged 35, who had no dropsical symptoms, and no albuminuria, yet after death his kidneys were seen to be exquisite examples of the contracted kidney. The whole of the colon was found to be the seat of extensive ulceration and waxy degeneration, and to this condition the exemption from dropsy and albuminuria was probably due. This is by no means a solitary instance in my experience. It has long been suspected that the value of calomel as a purgative in acute hydrocephalus is due to its reflex action on the brain through the intestinal mucous membrane. Occasionally remarkable benefit results from this method of treating dropsies; but, except in ascites, it is, upon the whole, of doubtful value, and its uses might be attained at less waste of strength by sinapisms to the back and legs carefully applied, so as to act by reflex action through the skin instead of the intestines.

Nervine Tonics and Stimulants.—There is a large and diversified group of means and drugs which act beneficially in dropsies directly through the nervous system. In Case XI., the *valerianate of iron*, combined with extracts of nux vomica and chamomile, was of immediate benefit. The tincture of the *sesquichloride of iron* seems to be rather a stimulant to the spinal cord than a blood-tonic. *Cantharides* used as a diuretic is, in fact, a powerful nervine tonic for the genito-

urinary system, and is indicated and beneficial in renal dropsies, associated with paraplegic paresis, spermatorrhœa, and sexual debility. I have used the *Secale cornutum* also with advantage in some cases. It is a nervine tonic of the vascular kind. *Strychnine* is a remedy of very varying value. In cases of dropsy with nervous thirst (polydipsia), albuminuria, and copious micturition (diabetes insipidus), it is of essential service. In a case of this kind under my care, in a gardener aged 39, of long standing, in which 178 oz. of highly albuminous urine, sp. gr. 1010, were passed daily, the quantity was reduced by strychnine in twelve days to 70 oz., and all the symptoms were ameliorated. The morbid appetite for water in dropsy is, I think, most commonly renal in its origin, and is due to a hyperæsthesia of the pelves of the kidneys. This view of the thirst of the dropsical is not, I think, commonly entertained, but it has arisen in my mind from observing the excessive thirst in cases of gouty pyelitis and gravel. Doubtless in some it is a genuine nervous thirst,—that is to say, is due to changes (hyperæsthetic) in the encephalic centre of the appetite. It is a very important symptom in dropsies, because the skin is generally dry; so that, should the kidneys fail in their functions, dropsy is rapidly developed. Hence the anasarca which arises in cases of diabetes mellitus when the urine becomes scanty. Strychnine seems to aggravate some kinds of dropsy, more especially those in which the urine is scanty and the lungs œdematous; so that it demands judgment and experience in its use. *Opium*, too, is of doubtful value in this class of cases, although in some kinds morphia seems to increase the quantity of urine.¹

There are persons who are constitutionally very intolerant of opium; these are usually of the neuro-vascular diathesis, and predisposed to atheromatous degeneration. In such opium and strychnine are likely to be injurious, but digitalis beneficial.

Faradization of the lumbo-sacral region is indicated in renal dropsies. I have observed that occasionally it immediately but only temporarily increases the amount of urine; in other cases, it seems to be of permanent advantage, and might be made a simple and valuable auxiliary to other means.

The Hot-Air Bath has been commonly prescribed with the view of stimulating the sudoriparous glands, but heat has a powerful action on the nerve-centres when applied to the skin; so that the process

¹ A case is mentioned by Sir George Baker (*opere citato*) of a woman, aged 39, who had suffered from a formidable ascites since the age of 20, and who, in consequence of violent rheumatic pains, was ordered to take four doses of Dover's powder, ℥ij. to each dose, on four successive nights. An hour or two after the second dose "she began to void her urine in large quantities, which she continued to do through the whole night, and as fast as she voided the water the belly sunk. She took another dose of the powder the next night, which, having had the effect of the former, the belly entirely sunk, and in all appearance the evacuation of water had been total and complete." The cure was radical.

may be classed with faradization. It is most useful, according to my experience, in acute cases, and in the desquamative forms of renal dropsy; it is also available in the syphilitic, but not generally borne well in the rheumatic and cardiac kinds, nor when the skin remains dry. I have treated cases successfully by the use of the hot-air bath alone, and a suitable diet and regimen. *Irritants* and *counter irritants* have been already noticed as really belonging to the nervine class, and acting upon the excretory organs and affected tissues by reflex action; dry cupping over the loins is often useful, and belongs to this class of remedies.

Diet and Regimen in Dropsies.—In the acute cases the diet and regimen are such as would be adopted in an ordinary case of acute rheumatism, the anasarca being the analogue of the articular affection. Warmth in bed, diluents, and quiet with friction over the lumbar region. In the chronic cases of general dropsy more care is required in determining the diathetic character in the blood and nerve causes. As a general rule the tone of the nervous system should be maintained by free exposure to the atmosphere, and confinement to bed especially avoided as long as possible. Carriage exercise is not always available, but sitting out in the open air may be attained, or at least the room be well ventilated. In all cases the limbs should be well bandaged with flannel, or the legs encased in elastic stockings. When the albumen is abundant in the urine, albuminous food must be taken freely. In cases following upon flooding I have seen it useful to combine glycyrrhine and bitter infusions and extracts with perchloride of iron. Mineral waters adapted to the diathetic condition should be selected; and, in choosing a "watering place," a dry, bracing mountain-air should be preferred. When the thirst is urgent, and the urine scanty, the important question arises whether drink should be freely allowed or not. If the urine be acid, and there be lumbar pains, the diluents suitable for rheumatic affections are indicated,—such as weak lime-juice, lemonade, weak solutions of cream of tartar, aerated alkaline waters, alkaline Vichy and other mineral waters. If it appear, however, that the thirst is not renal but nervous (a polydipsia), opium or its salts are more likely to relieve the symptom, and to enable the kidneys to carry off the excess of water taken by the patient. Diaphoresis induced by the hot-air bath is also indicated.

4 RUTLAND STREET,
EDINBURGH, 14th March 1866.



