had fits, nor any other illness; nor is there any indication of nervous disease in her family. She has been losing flesh somewhat. Her menstruation is regular, but rather profuse.

She has the aspect of health, and is fairly nourished; though her face is rather sunken; her pupils are quite natural; and the contents of her chest are healthy. The inertness of her will is strikingly evident; to every question, she returns a feeble grunt; she has not even energy enough to nod or to shake her head sufficiently to be understood, until thoroughly roused to do so. During examination of her chest, she complained of the percussion employed; and it was only by means of alternate scolding and cheering that the examination could be got through without interruption by a hysteric fit. In examining her throat by the laryngoscope, it was long before we could get the mouth opened, and then further time was lost in inducing her to protrude her tongue. The faucial mirror excited much sobbing, but we obtained a complete view of the larynx, every part of which was in perfect order. The arytenoid cartilages moved equally, but during the examination were kept in apposition, probably from the sobbing tendency manifested by the patient.

As stated before, she speedily passed away from my observation.

ST. GEORGE'S HOSPITAL.

OBSERVATIONS ON CEREBRAL HÆMORRHAGE, FROM AN ANALYSIS OF FORTY FATAL CASES.*

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[Continued from page 659 of last volume.]

III.—ETIOLOGY.

A. *Predisposing Causes.* (1.) *Age.* Of the predisposing causes, age has a decided influence. We are indebted to Dr. Burrows for correcting a great many errors upon this point. Before this, writers seem to have repeated, as a matter of fact, without further inquiry, an observation of Hippocrates, who affirmed that apoplexies happened between the ages of 40 and 60 years.

Out of the 40 cases, I find the age was noted in 38; of which—

- 3 occurred between the ages of 30 and 40
- 13 occurred between the ages of 40 and 50
- 10 occurred between the ages of 50 and 60
- 9 occurred between the ages of 60 and 70
- 3 occurred between the ages of 70 and 80

Primâ facie, this table shows a greater number of cases occurring between the ages of 40 and 50; but to form a correct calculation, we must take into consideration the *relative* number of individuals living in successive decades, as compared with the number of cases of cerebral hæmorrhage occurring in the same period. Now, out of a population, for instance, of 20,000, about one-half will have attained the age of 20 years; and out of the remaining 10,000, the number of persons living in the successive decennial periods, will be about 3,000 between the ages of 20 and 30; 2,500 between 30 and 40; 1,800 between 40 and 50; 1,300 between 50 and 60; 1,000 between 60 and 70; and 500 between 70 and 80. By comparing the number of cases of cerebral hæmorrhage with the respective number of population at similar ages, we

can easily calculate the proportion occurring in 1,000 persons in successive 10 years. Thus—

	No.	Population.	Per 1000.
Between the ages of 30 and 40 .. 3		2,500	 1.2
Between the ages of 40 and 50 .. 13		1,800	 7.2
Between the ages of 50 and 60 .. 10		1,300	 7.6
Between the ages of 60 and 70 .. 9		1,000	 9.
Between the ages of 70 and 80 .. 3		500	 6.

This table shows that the period of life at which the disease most frequently occurs is actually between 40 and 50, but relatively between 60 and 70.

(2.) *Sex.* Males are much more liable to the attack than females; for, out of 40 cases, 11 only were women. This shows the proportion of males attacked to be three-fourths, or 75 per cent. Possibly, this is explicable by the fact that they are most frequently exposed to the efficient causes of the disease.

B. *Exciting Causes.* There seems to me to exist a most intimate connection between diseases of the kidneys and of the heart and arteries, and cerebral hæmorrhage.

After excluding those cases in which the brain only had been examined after death, or in which but an imperfect examination of other organs had been made—because, for the present inquiry, a complete examination of all the important organs was necessary—I find myself possessed of notes of 36 fatal cases.

Of these, the kidneys were found extensively diseased in 29; showing the high percentage of 80.5. In 24 of these cases, the disease had arrived at an advanced stage of disorganisation; the organs were described as being small, hard, granular, with their cortical substance diminished; in some instances this was not thicker than a shilling. In 4, the kidneys were described as being large, soft, congested, and cystic, with old cicatrices on the surface. In another case, one kidney was found shrunken, leaving only a very small trace; whilst the other kidney appeared healthy.

Surely such a large proportionate number as 29 out of 36, or nearly 80 per cent, cannot be considered merely as the result of coincidence, but, on the contrary, as indicating a most intimate relation between disease of the kidneys and cerebral hæmorrhage. Besides, if the analysis be still further prosecuted, it will be found that renal disease bears a close relation to cardiac disease in these cases; for, out of the 29 cases in which the kidneys were found disorganised, the heart was hypertrophied to a great extent in 15; and this hypertrophy chiefly affected the left ventricle. In one case the heart was fatty, in three "very weak." Of these 19 cases in which were found alterations in the muscular structure of the heart, atheromatous deposits were found in 18 on the mitral and aortic valves, but probably not to such an extent as to give rise to obstruction, sufficient to produce the hypertrophy; hence we must look for a cause remote from the heart itself.

Of the remaining cases in which the muscular tissue of the heart was described as healthy, atheromatous deposits were found on the mitral valves in 6, in 1 of which there were thickening and opacity of the lining membrane on the right side; in 3 there were atheromatous deposits on the aortic valves, and the same kind of deposit on both the mitral and aortic valves in 5. Thus the heart was found more or less diseased in 29 cases; of these, alterations of the muscular structure occurred in 19, 15 of which were hypertrophied, 3 weak, and 1 fatty. In the remaining 10, atheroma alone existed; therefore these might have been classed with the diseases of the arteries. Thus we find that renal disease was associated with cardiac disease in 29 cases. In five cases both organs

* From papers read before the St. George's Hospital Medical Society during the sessions 1861-62 and 1862-63; and before the Western Medical Society, 1862-63.

were described as healthy. It is an interesting point to note, that in almost all of these there was a history of injury to the head having occurred at some time or another before the attack.

Again, in pursuing the analysis still further, a most marked connection will be found subsisting between cerebral hæmorrhage on the one hand, and disease of the kidneys and of the heart and cerebral and other arteries on the other. Thus, of the 36 cases, the cerebral vessels were diseased in 25; and the other large vessels of the body in 14. Cardiac and renal diseases were associated with disease of the cerebral vessels in 22. Renal and cardiac diseases, and diseases of the cerebral and other arteries, were associated in 10 cases. Disease of the heart was associated with disease of the cerebral vessels in 24 cases. But, of the cases of cardiac disease, it must be borne in mind that 15 only were hypertrophied; and of these, disease of the cerebral arteries occurred in ten only. In the remaining five cases of hypertrophied heart, the cerebral vessels were pronounced healthy. Disease of the kidneys, on the contrary, was associated with disease of the cerebral vessels in 22 cases.

The above analysis may possibly be better understood by viewing it in a tabular form, thus:—

Cerebral vessels.	Other vessels.	Heart.*	Kidneys.	
Diseased.	Diseased.	Diseased.	Diseased.	10 times.
Ditto.		Ditto.	Ditto.	22 "
		Ditto.	Ditto.	29 "
Diseased.		Diseased.	Ditto.	22 "
Ditto.		Hypertrophy		24 "
Ditto.		of heart.		10 "
	Diseased.	Diseased.	Diseased.	13 "
	Ditto.			13 "

By this we find that, in almost two-thirds of the cases, the kidneys, heart, and cerebral vessels were simultaneously affected. And in almost all those cases in which there was absence of disease in one or other of these organs, there was a history of an accident, to which the attack was attributed. This disease of the arteries consisted of thickening and deposit within, or on the surface of the coats.

These deposits were described as being either fatty, atheromatous, or calcareous. I have seen the small vessels, owing to calcareous deposit in their coats, sticking up out of the white matter of the brain after it was sliced, about an eighth of an inch in length.

The foregoing facts clearly point to a decided connection existing between the lesions of the arteries, kidneys, and heart; but in what the relation consists, and the influence which the lesion of each of these parts exerts in the production of the hæmorrhage into the brain, remain yet to be discussed. To do this, I must digress from the mode of investigation hitherto adopted in this inquiry, and soar to the regions of hypothesis. Most probably the kidneys are the organs first affected, and resulting from this the other lesions are developed, in the following order: diseased vessels, hypertrophy of the heart, and extravasation of blood in consequence of rupture of diseased cerebral vessels. Rather than attribute the disease of the vessels to some inexplicable or mystical causes, as we are wont to do, perhaps it would be well to attempt a more direct explanation.

Dr. Kirkes (in an excellent paper on this subject) has maintained that hypertrophied heart may possibly be the cause of such changes in the vessels. According to Dr. Kirkes, it was Dr. Dittrich who first propounded the theory that diseased arteries may be caused by hypertrophied heart, in consequence of

that organ keeping up a continual over-distension of the vessels, by the unwonted energy with which it propels the blood along the arteries. The coats of the vessels, being stretched and weakened by this continued pressure, undergo structural changes, somewhat analogous to the softening and degeneration which other strained and excessively exercised tissues often suffer.

The arguments adduced in support of this hypothesis are: 1, the frequency with which hypertrophy of the heart is associated with general arterial disease; and 2, the occurrence of the disease first, and chiefly, at those parts most exposed to the force of the moving blood, namely the commencement of the aorta. Dr. Kirkes adopts the same explanation, but, in addition, believes "that the coats, before degenerating, undergo a kind of protective hypertrophy to enable them to bear up against the increased pressure to which they are subjected, and that degeneration only ensues when this compensating over-growth has attained its utmost limit." Dr. Kirkes supports this theory by the narration of one case only, which, to my mind, does not prove that that condition of the vessels which he describes was due to the existing hypertrophied heart, inasmuch as the patient also suffered from a most extensive disease of the kidneys, quite sufficient to give rise to the lesion observed in the arteries.

Having regard to the result of the analysis of the cases which form the basis of the present inquiry, I object to the theory of considering the heart as being the cause of degeneration of vessels; because, first, how are we to account for the diseased vessels in more than half the cases in which the heart was *not* hypertrophied? Secondly, there is no evidence to show that degeneration of vessels takes place while the blood is in its normal state; for hypertrophied heart and diseased arteries were associated in all the above cases with renal disease, and, consequently, abnormal state of the blood. Lastly, seeing that the hypertrophy of the heart in these cases is but a compensating growth to supply the increased energy required to propel the unhealthy blood, I question very much whether there be *actually* more pressure from this cause upon the walls of the arteries than in health.

I think it is much more probable that the arterial lesion in these cases is caused by the renal disease. It is generally admitted that the small, granular and contracted kidneys—such as existed in almost all the cases under discussion—by their deranged function, alter the quality and quantity of the urine and blood. The blood, in being deprived of its chief staminal principle—the albumen—becomes diminished in density; and by the retention of urea and other solids of the urine it becomes absolutely poisoned, which considerably interferes with proper sanguification, so that this fluid is in turn rendered unfit to carry on the nutrition of the tissues of the body. Accordingly, we find almost always those persons who are the subjects of the renal disease, pale, anæmic, remarkably sallow, and the muscles soft and flabby. Probably the *arteries* suffer in a pre-eminent degree from this defective nutrition, which possibly may be the cause of their degeneration.

But this degeneration of the arteries may be produced from a more direct cause—as from the immediate effect of altered blood upon their walls. On examining the web of a frog's foot under the microscope, whilst the animal was under the influence of chloroform, the blood, which previously moved rapidly, soon became more sluggish in its movements—some of the corpuscles tending to stick to the sides of the vessels, and forming, as it were, a kind of a nucleus for more, until the vessels became completely blocked up with them.

* Of the cases of diseased heart, hypertrophy occurred in 15.

Now, I can quite conceive a similar phenomenon taking place when the blood is poisoned by the retained elements of the urinary excretion. Indeed, it is a matter of not very unfrequent occurrence in hospital practice to observe a deposit or stagnation of the fibrinous part of the blood in the vessels of those individuals whose blood is altered in quality, such as in cases of chlorosis, phthisis, and other diseases leading to cachexia. I have seen not a few cases of chlorosis and phthisis at this hospital, in which the vessels of the lower extremities had become completely blocked up—a state of things possibly originating in that attraction which exists in health between the blood and the vessels being destroyed—thus necessarily leading to stasis of the blood, and collection of morbid materials retained in that fluid along the sides of the vessels.* In disease of the kidneys there exists that condition of the blood necessary to occasion the same phenomena. Possibly, the retained elements of the urine and the fibrine of the blood deposit on the sides of the vessels, which may produce degeneration or atheroma of their coats, either by undergoing certain transformations, or by setting up a kind of chronic inflammation, terminating in the same pathological changes.

It is hardly necessary to insist upon what is now generally admitted as a well established fact by pathologists, namely, that hypertrophied heart is also caused by this degeneration of the kidneys. There are several conditions existing which call upon increased pressure on the part of the heart, and, consequently, involving increased muscular growth of its left ventricle to meet that emergency, some of which are: the abnormal constitution of the blood from the retained urinary excretion and diminished density, both of which cause that fluid to move through the vessels with less facility; the impeded transit of blood through two such vascular organs in consequence of structural changes; and lastly, the altered state of the vessels. That the heart requires much more power to propel blood through the arteries which have lost their elasticity, is self-evident. Hence, I maintain, first, that cerebral hæmorrhage, when associated with renal disease, is almost always found to be dependent upon rupture of one or more of the cerebral arteries, in consequence of certain morbid changes having taken place in their walls; secondly, that these changes in the walls of the vessels are induced by the altered state of the blood, the effect of advanced disease of the kidneys; and lastly, that the enlargement of the heart is the immediate effect of the renal disease, conjointly, perhaps, with the alterations in the coats of the vessels.

* In these cases, I believe no inflammation is set up in the first instance; but subsequently there is reason to suppose that a chronic form of inflammation takes place.

[To be continued.]

NON-COMBATANT OFFICERS. Few, when they heard of the departure of the twelve physicians for Bermuda, ever thought of the dangers they would so soon meet; and yet they are as great as that encountered by assistant-surgeons Manley and Temple in their brave conduct at the recent engagements in New Zealand, and for which their Queen has decorated them with that badge of distinguished bravery the Victoria Cross. We cannot but admire the spirit of true heroism which is exhibited by the man who, at the call of duty, walks to almost certain death, in aid of his fellow-creatures, suffering from a malignant infectious disease; this, in our opinion, is of greater merit, than he who marches to the cannon's mouth, during moments of intense excitement. (*Canada Medical Journal.*)

Original Communications.

PENETRATING WOUNDS OF THE KNEE-JOINT, AND THEIR TREATMENT BY IRRIGATION.

By WILLIAM NEWMAN, M.D.Lond., St. Martin's, Stamford.

IN a paper which was published in the *BRITISH MEDICAL JOURNAL* for June 27th, 1857, I narrated five cases of penetrating wound of the knee-joint, and drew attention to the treatment by irrigation, followed, in each instance, by a speedy and satisfactory recovery.

I have no novelty to bring forward; but I am anxious to supplement the above-named paper by a further contribution, adding the few cases of the same injury which have, within the past seven years, come under my notice; and at the same time I would enter more fully into the merits and employment of continuous irrigation as an agent of extreme value in the every-day requirements of surgical practice.

CASE I. In January 1862, I was asked to see a groom (a man over 50 years of age), who had, twelve days previously, fallen from a haystack upon the cutting-knife, and had laid open, by a slanting incision on the outside, his right knee-joint. The man had been kept quiet in bed, and the injury had been treated by poultices, leeches, etc.; but he was suffering considerable pain, had had very bad nights in spite of frequent opiates, while the joint was swollen, the integuments around puffy and infiltrated, and a gaping wound was freely discharging pus and synovia.

Irrigation was recommended, and continued steadily for twenty-four hours; so securing to the patient a good night's sleep, the first since the accident happened. After that time, from disturbing causes, other treatment was determined on, and employed. A week afterwards (nineteen days from the infliction of the injury), irrigation was again resorted to, at the patient's own request; and the progress to recovery was steady and satisfactory. Sedatives were no longer necessary; the nights were good, and the wound healed. Constantly used at first, the water was, after some time, only allowed to drop on the knee when the joint became, even in slight degree, hot and painful.

CASE II. In May 1862, I saw a labourer, who had, two days before, sustained a punctured wound of the knee. The left knee-joint was distended by effusion, and painful in some measure; but the symptoms were not of the same urgency as those usually met with. Possibly, the extreme *nonchalance* and indifference which the man strongly showed existed physically as well as mentally; and his nervous system may have been singularly insusceptible of external impressions.

Irrigation was suggested, and carried out for six or seven days. At the end of that time, all joint-irritation had subsided; the swelling, also, had quite disappeared.

CASE III. The details of this I propose to give at length, since some of the main points are well illustrated.

W. P., aged 40, agricultural labourer, came to my house on August 24th, 1864, having walked a mile from his own house to a side railway-station, and thence travelled by rail; the transit had given him a good deal of pain.