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WHAT IS URÆMIA?

Paper read at the Regular Meeting of the Toronto Medical Society, February 19th, 1889.

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FROM an etymological point of view this question is easily answered; the word simply denotes an abnormal amount of urea in the blood, and was the name given to a certain group of pathological phenomena by those (1) who first considered them to be due to such an altered condition of this important fluid. The correctness of this original view I shall discuss later on.

In a well known text-book it is defined as "*The accumulation in the blood of excrementitious substances in the urine, and is a term usually applied to a group of symptoms which appear when the function of the kidneys is interrupted or much impaired*" (2). Dr. W. Carter, of Liverpool, in his Bradshawe Lecture, delivered before the Royal College of Physicians, London, in August, 1888, says, "*Uræmia may be defined as the altered condition of health caused by the accumulation within the body of poisonous products that should be eliminated by the kidneys.*" (3).

Common to the diffuse, non-suppurative affections of the kidneys, which are collectively

known as Bright's Disease, are certain clinical symptoms, which appear in a degree more or less marked in all the forms. These are: albuminuria, tube-casts, cardiac and vascular changes, hemorrhages, dropsy, secondary inflammatory lesions, retinitis and optic neuritis, and, lastly, uræmia; which is, therefore, not a disease in itself, but only a symptom or group of symptoms, the origin and causation of which I propose to examine into with some degree of minuteness.

It is quite evident that this subject admits of a very natural division into two distinct parts, and may be discussed under the two heads of *clinical characters* and *pathogenesis*.

CLINICAL CHARACTERS.

Under this head I shall be very brief, as this paper is mainly concerned with the second part of the subject. Among uræmic symptoms are included very different functional disorders of the nervous system, which manifest themselves in varying combinations, and most of which are doubtless of cerebral origin. Accompanying that form of Bright's Disease known as parenchymatous nephritis, especially in its acute stage, are certain nervous symptoms which we may call those of *acute uræmia*. The most common of these are sudden attacks precisely like those of epilepsy, which may be the first indication to the patient that there is anything wrong; or there may be prodromal symptoms preceding the epileptiform seizure by a few hours or days, such as vertigo, drowsiness, headache, ill-defined pains in the limbs, more or less rigidity of cer-

(1). Piorry, Willis.

(2). FLINT. Practice of Medicine, 5th Ed., p. 76.

(3). British Medical Journal, Sept. 1, 1888, p. 463.

tain muscles of the face or extremities, or nausea and vomiting, or perhaps dyspnoea. The convulsions are exactly the same as those occurring in epilepsy. There is the initial tonic spasm more or less marked, followed by clonic spasms, with biting of the tongue, foaming at the mouth, twitching of the eyes, inequality and alternate dilatation and contraction of the pupils, which are generally insensible to light; though it is asserted by E. Wagner⁽⁴⁾ that the pupils are generally dilated and seldom insensible; while Fagge⁽⁵⁾ says, "at Guy's Hospital from the time of Addison it has been usual to describe them as being more often contracted, or of the normal size, and as usually retaining their sensitiveness to light."

There is also frequently an involuntary discharge of urine and fæces, and sometimes of semen, and the temperature generally rises three or four degrees and may even reach 106° F., the frequency of the pulse being at the same time increased. Then follows the stage of stupor or coma, when the temperature and pulse fall to normal or lower, the patient passes into a deep sleep of several hours duration, and remains perhaps for some days in a stupid dazed condition. Or, before the insensibility of one attack has passed off, another convulsion supervenes, and the paroxysms may rapidly succeed one another till death puts an end to the distressing scene, after perhaps twenty or thirty separate convulsions.

Again, in place of the comatose stage, there may be violent maniacal delirium generally terminating fatally; and also, what is very important to bear in mind, the initial convulsions may be wanting, and there is only a sudden onset of coma with stertor, as described by Addison⁽⁶⁾, which has frequently been diagnosed as cerebral apoplexy.

Here I may venture to remark that probably many cases of so-called apoplexy or cerebral hemorrhage not attended with motor paralyses, would, if submitted to post mortem examination, fail to furnish any evidence of intra-cranial effusion of blood, and are really due to uræmia, even

when there has been no suspicion of the existence of renal disease during life.

In other cases there may be nothing but delirium marking the uræmic seizure, which may last for days. Or there may be only a rigidity or tremor in one or more of the limbs, while the mental faculties are in no way disturbed. It is important also to note that the symptoms are often very similar, if not identical, with those of Jacksonian or cortical epilepsy.

Amaurosis, generally associated with cephalalgia, is another remarkable symptom which is sometimes the result of uræmia. It arises suddenly and as suddenly disappears. It is bilateral and generally complete, and is to be distinguished from those disturbances of vision which depend on chronic structural changes in the retina and optic disc, which so often occur in the course of chronic Bright's Disease (though amaurosis may be associated with albuminuric retinitis), for the ophthalmoscope reveals no pathological alteration of the visual apparatus sufficient to account for the sudden blindness. It was supposed by Dr. Crocq⁽⁷⁾ to be due to œdema of the retina; and Gowers cites two cases where slight œdema of the discs was observed, which disappeared when the amaurosis passed away, and he says, that even where the blindness is complete the pupils generally still react to light. This would seem to show that the lesion must be above the corpora quadrigemina. Sometimes amaurosis is the only symptom of the uræmic condition; but not infrequently it follows, or may even precede the epileptiform convulsions. Tinnitus aurium, or perhaps complete deafness, is occasionally also a sequel.

Finally, instead of the well-marked eclamptic seizure, uræmia may give rise to only a few weak spasms in the facial muscles, or in those of the eyeballs or extremities, or to a slight trismus, consciousness being retained with perhaps some degree of confusion.

Associated more especially with the chronic forms of Bright's Disease, and perhaps too with the typhoid state which sometimes follows cholera, are certain phenomena, some obviously of nervous origin, others not, which we may call *chronic uræmic symptoms*. These are headache, vertigo, increasing drowsiness, stupor continuing

(4). WAGNER, ERNST. *Handbuch der Pathologie*—translated by Drs. Van Duyn and Seguin, New York.

(5). FAGGE. *Practice of Medicine*, Vol. II. p. 468.

(6). *Guy's Hospital Reports*, 1839.

(7). *Presse Medic. Belge*, Oct., 1850, p. 393.

for weeks, perhaps with intermissions, advancing to complete coma and death, which, however may be preceded by one or two epileptiform convulsions. Generally towards the end the other symptoms of the "typhoid state," such as dry, brown, fissured tongue, and sordes on the lips and teeth, appear. Very often this greatly depressed condition of the nervous system is accompanied by an intense itching of the skin, so that the patient will constantly scratch himself though unconscious. There may also precede or accompany the mental disorder paroxysmal attacks of dyspnoea—so-called renal asthma, occurring generally at night, and perhaps due to arterial spasm,—as well as hiccough, vomiting and diarrhoea. The two latter symptoms would seem to be due to the irritation caused by the presence in the alimentary canal of ammonium carbonate derived from the decomposition of urea under the influence of alkalis⁽⁸⁾.

PATHOGENESIS.

Some of the foregoing symptoms, or various combinations of them, generally arise when the normal function of the kidneys is seriously interfered with from any cause. The kidney is the main organ for getting rid of the nitrogenous waste materials of the body; therefore there is a strong presumption that at bottom uræmia depends on the non-excretion, or accumulation in the blood and tissues, beyond the normal amount, of these nitrogenous waste products, and perhaps derivatives of them, which are not formed in the normal state, but which may be developed in the abnormal condition in which the organism is placed. How does the non-excretion of these substances produce a deleterious effect? On what organs or tissues are their toxic influences exerted? What structural changes, if any, are produced which might account for the altered functions of the various organs? Can uræmic symptoms arise without organic disease of the kidneys? These are some of the questions which we must try to answer; and it seems to me that the best method to pursue in this inquiry is to begin with known and easily ascertainable facts, and from these advance as carefully as we can to the more diffi-

cult and intricate parts of the problem. The means to be employed are two—observation and experiment; observation and comparison of clinical facts when the abnormal condition recognized as uræmia is naturally presented to us, and experimental attempts to produce an analogous condition artificially. Both of these methods have been employed by numerous investigators, especially within the last few years; and I shall endeavor to collect the most reliable results and place them before you in the order indicated above.

It is an undisputed fact that suppression or diminution of urine, or the elimination of urine of more or less altered chemical constitution, due to certain organic diseases of the kidneys, is attended by symptoms described as uræmic.

Now let us first inquire what is the composition of normal urine, what is the origin of its various constituents, and what is the effect of their non-excretion. The following table (after Parkes) gives the amounts of the several urinary constituents passed in twenty-four hours by an average man of sixty-six kilogrammes (145 lbs.)

	GRAMMES:
Water	1500.000
Total solids	72.000
Urea	33.180
Uric acid555
Hippuric acid400
Kreatinin910
Pigment, and other substances	10.000
Sulphuric acid	2.012
Phosphoric acid	3.164
Chlorine	7.000(8.21)
Ammonia770
Potassium	2.500
Sodium	11.090
Calcium260
Magnesium207

The *water* of course comes directly from the blood, being derived from the ingesta, and its chief purpose is to act as a solvent for the other excrementitious matters, though a certain amount must be got rid of constantly to preserve the normal fluidity of the blood. The amount of water excreted as urine depends primarily upon the blood-pressure in the area of the renal artery, and follows therefore the laws of filtration; or,

(8). COHNHEIM. Vorlesungen über Allgemeine Pathologie.

to put it more accurately, it depends on the difference between the blood-pressure in the glomeruli and the pressure in the renal tubules.

Non-excretion of water then, if complete, means complete suppression of all renal excretion; and the effect upon the blood of a deficient excretion of water, apart from the retention of the urinary solids, supposing it not to be corrected either by a deficient ingestion or increased loss through some other channel, must be to increase the whole amount of the circulating fluid, while diminishing the percentage of its solids. This state may be called a "hydræmic plethora," (Cohnheim), or polyæmia serosa vel aquosa.

But it is a fact that even complete suppression in Bright's Disease, obstructive suppression, hysterical anuria, or experimental ligature of the ureters does not materially alter the volume of the blood or the blood-pressure⁽⁹⁾; so that in some way or other the inactivity of the kidneys is compensated for. On the other hand, the injection into the circulation of considerable amounts of serum or salt-solution neither raises the blood-pressure nor produces general dropsy or uræmic symptoms, unless at the same time the ureters are ligatured. But Cohnheim and Lichtheim⁽¹⁰⁾ have shown that by injecting a six per cent. solution of common salt until the death of the animal, which generally took place gradually, serous transudation occurred from the glands and into certain lymphatic channels and tissues; there was more or less ascitic fluid, the mucosa and submucosa of the stomach and intestine were œdematous, also the pancreas and kidneys, but there was no fluid in the pericardial or pleural sacs, nor was there œdema of the lungs, of the central nervous system, or of the subcutaneous connective tissues. The only way then in which deficient excretion of water can act as a cause of uræmia is by preventing the elimination of the solid matters of the urine.

There is, of course, an increase of blood-pressure in some forms of Bright's Disease, especially the chronic, but its cause must be sought elsewhere than in hydraemic plethora.

(9). FAGGE. Loc. cit., p. 460.

(10). COHNHEIM J., LICHTHEIM, L. Ueber Hydrämie und Hydrämische Oedem. Virchow's Archiv, 1877, XCVI.

The non-elimination of water, however, and the heightened blood-pressure, have given rise to the mechanical theories of uræmia. Owen Rees⁽¹¹⁾, attributing renal dropsy to hydræmia, supposed that when the great nerve centres became implicated in dropsy, that was quite enough to explain the uræmic symptoms. Traube⁽¹²⁾ and his followers advanced the same theory in a somewhat modified form. According to him, cardiac hypertrophy, heightened blood-pressure, and watery blood, caused cerebral œdema, followed as a consequence by cerebral anæmia, and this affecting one or other portion of the brain gave rise to the uræmic convulsions or coma. Munck⁽¹³⁾ endeavored to support this theory by experimental evidence; and more recently Mahomed⁽¹⁴⁾ has gone a step further in the same direction. He ascribes the drowsiness and coma to cerebral œdema, and the convulsions to the presence of numerous punctiform hemorrhages in the gray matter of the convolutions. It has been pretty conclusively proved, however, that every part of this ingenious theory is untenable. In many instances⁽¹⁵⁾ the brain has been found *post mortem* to contain no more than the normal relative amount of water, and even where an œdematous or hemorrhagic condition has been observed, it is to be considered perhaps as the effect rather than the cause of the convulsions⁽¹⁶⁾.

Of the solid constituents of the urine, *urea* is the most important. It represents the final stage in the metabolic changes through which nitrogenous compounds (proteids) pass in their transit through the body. There have been great differences of opinion among physiologists as to its antecedents and place of formation, and the only statements in regard to it that one can make with certainty so far are, "that it is the chief end product of the metabolism of the

(11). REES, OWEN. On the Nature and Treatment of Diseases of the Kidney Connected with Albuminous Urine; London, 1850.

(12). TRAUBE. Gesammelte Beiträge zur Pathologie und Physiologie, 1871, Bd. 2, s. 551.

(13). MUNCK, PH. Ueber Urämie, Berliner Klin. Wochenschrift, 1864, s. 111.

(14). MAHOMED, F. A. On the Pathology of Uræmia and the so-called Uræmic Convulsions. British Medical Journal, 1877, II., 10, 42.

(15). CARTER. Loc. cit.

(16). BARTELS. General Symptoms of Renal Disorders. Ziemssen's Cyclopædia of the Practice of Medicine, Vol. XV., p. 138, 1877.

proteids" (17); that it is not formed in muscle or in nerve tissue, a fact that has been abundantly proved by several observers (18); and that it is not a secretion manufactured by the activity of the renal epithelium, because the blood of the renal vein contains less urea than that of the renal artery; and because after nephrectomy, after ligation of the renal vessels, or after ligation of the ureters, the amount of urea in the blood increases (19). It exists then pre-formed in the blood, and it is the function of the kidney simply to withdraw and excrete it. It should be mentioned, however, that some observers have noticed that the amount of urea in the blood after ligation of the ureters is greater than after nephrectomy; and, if so, it is probable that some of it is manufactured by the renal cells from the kreatin of the muscles (20). But clinical and experimental evidence point strongly to the liver, and probably also the spleen and lymph glands, as the organs concerned in its production from the albuminous elements of the food, and the proteids found in the various organs and tissues of the body (21). The foregoing remarks concerning the function of the renal epithelium are not necessarily at variance with the conclusions to be drawn from Heidenhain's (22) experiments, nor do they assume that the cells lining the tubules act as mere mechanical filters. We must believe that their protoplasm is actively engaged in vital processes, the micro-chemistry of which we do not understand. It is not possible as yet to arrange a table showing the consecutive changes the food undergoes from peptones to urea, but many of the intermediate compounds are known, as leucin, tyrosin, glycin, and asparaginic acid; and also the less oxidized allies of urea, uric acid, guanin, hypoxanthin, xanthin, alloxan, allantoin, and oxaluric acid, all of which are excreted in varying amounts by

the kidney when not completely converted into urea.

One of the most important of these as a means of getting rid of nitrogenous waste is *uric acid* and its salts. It is always present in healthy urine to a small extent; and it also would seem, from the experiments of Minkowski and others, to be formed in the liver.

Hippuric acid in the urine is derived directly from the food, being a compound of benzoic acid and glycin. By some authorities it is thought to be formed mainly in the kidneys (23), and by others in the liver and intestine (24).

Kreatinin doubtless is derived from the kreatin of muscle, but in what organ or organs it is formed is not known.

In our table included under the head of *pigment and other substances*, are, besides those already named, the coloring matters derived from the hæmatin through the bile-pigments; the non-nitrogenous bodies oxalic, lactic, and succinic acids, and sugar; and those substances which are usually excreted, as aromatic ether-sulphuric compounds, indol, phenol, kresol, pyro-katechin, and skatol. All these are formed in the alimentary canal, some being the result of putrefactive changes, and excreted chiefly as *fæces*

The other normal constituents of the urine referred to in the table, it is needless to say, are not formed by the renal protoplasm, except in so far as they may be results of its disintegration, but are derived from the food, and from the metabolism of the tissues generally.

Now, when the function of the kidneys is arrested these waste materials must be excreted by other channels, or else accumulate in the blood and tissues; for, as we have seen, all of them are being constantly formed outside of the kidneys. What is more natural than to conclude that by their retention and circulation, the nervous, as well as other tissues, are poisoned, and as a result we have the symptoms of uræmia? And, as of these excreta, urea is the most important in amount, it was also very natural to jump at the conclusion that it was the toxic agent. There is no doubt that in uræmia the

(17). LANDOIS AND STERLING. Text-book of Human Physiology, 2nd American Ed., p. 481.

(18). Voit, Fick, Wislicenus, Parkes, Flint, Haughton, Gréhant, Quinquand, Salomon, Smith, North, etc.

(19). Picara, Gréhant, Prévost, Dumas, Meissner, Voit, Cl. Bernard, Bareswill, etc.

(20). OPPLER, ZALESKY. Virchow's Archiv, XXI., 260.

(21). Gscheidlen, Cyon, Von Schröder, Salomon, Minkowski, Brouardel, Noël-Paton, etc.

(22). HEIDENHAIN. Pflüger's Archiv, IX. (1874), 1.

(23). Meissner and Shepard, Bunge, Schmiedeberg, Kochs.

(24). Kühne, Hallwachs, Jaarsveld, Stockvis.

amount of urea excreted in the urine is often greatly diminished, while several observers have shown that the blood in this state contains more of it than in health⁽²⁵⁾; though the statements in regard to this are rather conflicting. It may also be discovered in considerable quantity in the various secretions, such as the gastric and intestinal fluids, the bronchial secretions, and especially in the sweat. But it has also been shown that urea itself is not very, if at all, poisonous⁽²⁶⁾, at least if the animal to which it is administered is allowed a plentiful supply of water; then it will be eliminated without causing the slightest disturbance, though if water be withheld uræmic symptoms appear. Clinical evidence, however, is against the view that urea is the cause of uræmia, for the blood is sometimes loaded with urea, and yet no such symptoms appear.

To get over this difficulty Frerichs⁽²⁷⁾ suggested that, as urea is readily decomposed in the bladder under the influence of a ferment into ammonium carbonate, this decomposition takes place in the blood and tissues when the urea is not excreted, and that the ammonium carbonate so produced is the cause of uræmia. Petroff⁽²⁸⁾ also, as the result of his experiments, came to a similar conclusion. This view was afterwards modified by Treitz⁽²⁹⁾, who said that the ammonium carbonate was not produced in the blood, but in the alimentary canal from the urea excreted into it, and then re-absorbed by the blood; and more recently Cuffer⁽³⁰⁾ has endeavored to show by clinical observations and experiments on animals that ammonium carbonate, by diminishing the number and impairing the respiratory capacity of the red blood-corpuscles, produces a greater or less degree of asphyxiation of the nerve centres, thus explain-

ing many of the uræmic symptoms; he also holds that kreatin has a destructive action on the red corpuscles, though to a less degree than ammonium carbonate. But this theory of *ammoniaemia*, as it is called, will not stand the test; for, though it has been shown that ammonium carbonate injected into the blood causes symptoms somewhat like those of uræmia, yet so will many other salts, and it is denied by competent authorities⁽³¹⁾ that the blood in uræmia contains any appreciable quantity of ammonium carbonate, though it is found in the alimentary canal.

We must agree with Rommelacre, when he says: "All the theories which seek to explain the occurrence of uræmia through a retention of some one or other constituent of the urine in the system are not in harmony with the facts"⁽³²⁾; and its cause must be sought in the defective excretion by the kidneys of all those waste products which it is their duty to get rid of. Schottin, Oppler, Hoppe-Seyler, Rommelacre, Voit, Roberts, and others, emphasize the fact that it is the function of the kidney to excrete such products as kreatinin, the amido-acids and pigments, and that it is the non-elimination of all of these, rather than of urea, that produces the uræmic symptoms. The first three of the observers just mentioned would seem to attribute these symptoms in renal disease to an arrest of tissue change, to a disturbance of the normal endosmosis and exosmosis between the blood and tissues, and to a general diminution of its normal alkalinity. In this way, by the accumulation of decomposition products, and the disturbance of nutrition in the nervous centres, alterations in their chemical composition must be brought about which interfere with their functional activity. This view is upheld by Perls, of Königsberg⁽³³⁾.

Rommelacre⁽³⁴⁾ holds that it is essentially wrong to base a theory of uræmia on experimental evidence, but that it must be established

(25). Babington, Wagner, Hoppe, Owen Rees.

(26). Owen Rees, VOIT: Zeitschrift für Biologie, Bd. 4. München, 1868, Dr. Paul Cuffer, etc.

(27). FRERICHS. Die Brightische Krankheit und deren Behandlung, 1851.

(28). PETROFF. Zur Lehre von der Urämie, Virchow's Archiv, Bd. 25.

(29). TREITZ. Ueber Urämische Darmaffection. Prager Vierteljahrschrift, 1859, Bd. 4.

(30). CUFFER, DR. PAUL. Recherches cliniques et expérimentales sur les altérations du sang dans l'urémie, et sur la pathogénie des accidents urémiques. De la respiration de Cheyne-Stokes dans l'urémie, Paris, 1878.

(31). Bernard, Schottin, Oppler, Zalesky, Kühne-Strauch, Rosenstein.

(32). ROMMELACRE. De la pathogénie des symptômes urémiques. Etude de physiologie pathologique. Journal de Médecine, etc., vol. 44. 45. Bruxelles, 1867.

(33). PERLS. Beiträge für Lehre von der Urämie. Königsberger Medicinische Jahrbücher, 1864, Bd. 4.

(34). ROMMELACRE. Loc. cit.

by clinical experience alone, and suggests, that as the suppression of the urinary secretion prevents the elaboration of albuminoid substances through out all the tissues in the manner above described, we have to deal with the retention of not only urea, but of nitrogenous substances in all the intermediate stages of oxidation through which they pass; and clinical experience, as well as experiment, shows that no one of these substances occurring in the blood is alone responsible for the uræmic symptoms. Bartels⁽³⁵⁾ also warns us against the one-sided, preconceived ideas of experimenters who have "identified the results of the most gross interference with the organisms of animals with the events which follow in the human body when the functions of those most important secreting glands, the kidneys, are persistently abrogated," and thinks, though experiments upon animals are a useful enough adjunct in our researches, we should depend mainly on clinical observation. If, however, the view of the function of the kidney as merely a separating or excretory, and not a secretory organ proper are correct, these objections lose much of their weight.

In this connection two remarks, the importance of which is often overlooked, seem called for. One is, that as has been clearly pointed out by Dr. Roberts⁽³⁶⁾, the symptoms of "obstructive suppression" of urine are altogether unlike those of uræmia, and pursue a completely different course towards a fatal issue; and the other is, that while the amount of urea excreted in the urine in renal disease is usually diminished, it is not always a measure of the total amount of nitrogenous excretion, and therefore, though there may be a marked deficiency of urea, there may be no uræmia, while it is also true that uræmic patients may excrete the usual, or even an increased, quantity of urea. There is no doubt that what we call uræmic symptoms, met with in renal disease, do depend on some disturbance of the functions of the kidney, but they are not always brought about in the same way, and are not to be explained by the same cause. Much more definite information than this it seems to me that clinical

observation as yet cannot give, and for further light we must consult the experimental method. Within recent years a good deal of careful work has been done in this direction. Feltz and Ritter⁽³⁷⁾, as the result of many experiments in injecting healthy urines into the blood of animals, arrived at the principal conclusion that the potassium salts were the only really toxic agents, urea of all the constituents being the least harmful. Voit⁽³⁸⁾ also years before had expressed his conviction that it is excess of potash in the blood, derived from the retrograde metamorphosis of muscle, that is largely concerned in producing the symptoms of uræmia.

The discovery of ptomaines in 1872 by Gautier and Selmi, and the researches in this department of organic chemistry by a host of workers since then, have opened up fresh fields in the experimental study of the pathogenesis of uræmia. These interesting observations are to be found in various communications of Gautier and Etard⁽³⁹⁾, Pouchet⁽⁴⁰⁾, Brieger⁽⁴¹⁾, and Debieire⁽⁴²⁾, on ptomaines, and especially in the researches of Gautier, Pouchet, Feltz, Ritter, Dupard, Lépine, Guérin, and particularly Bouchard⁽⁴³⁾, on leucomaines. The latter began his observations on the alkaloids of normal urine in 1884 by injecting into the veins of the ear of a rabbit variable amounts of urine, and examining from the beginning the toxic phenomena. These phenomena he found to be contraction of the pupils, acceleration of respiration, inco-ordination of muscular movements, somnolency, pyrexia, diminution of palpebral and corneal reflexes, coma, and death, either without convulsions, or with moderate spasms, while all the time there were frequent emissions of urine. He also determined the quantity of toxic matter necessary to kill one killogramme of rabbit to be represented by 45 c.c. of normal urine; and an adult man in

(37). V. FELTZ et E. RITTER. De l'Urémie Expérimentale, 1881.

(38). VOIT. Loc. cit.

(39). GAUTIER ET ETARD. Comptes rendus de l'Académie des Sciences, T. XCIV.

(40). POUCHET, GABRIEL. Thèse de Paris, 1881.

(41). BRIEGER. Microbes, ptomaines et maladies, trad. de Roussi et de Winter, Paris, 1887.

(42). DEBIERRE. Les Maladies infectieuses, microbes, ptomaines et leucomaines, Paris, 1888.

(43). BOUCHARD. Les Auto-intoxications dans les maladies, leçons recueillies par Le Gendre, Paris, 1887.

(35). BARTELS. Loc. cit.

(36). ROBERTS. On Urinary and Renal Disease, 3rd ed., 1876, p. 26 and following.

good health excretes in twenty-four hours for each kilogramme of his weight a quantity of urinary poison capable of killing 464.5 grammes of living matter. His urotoxic coefficient then is 0.4645 kilogrammes, and it takes on an average fifty-two hours to manufacture enough of this urinary poison for auto-intoxication. Bouchard then examined the changes produced in urinary poison under varying physiological conditions, and he found that its toxicity varied during waking and sleeping hours. It is at its minimum when one goes to sleep, and increases during the sleep; it is diminished by muscular exercise; and urine secreted during the day has a narcotic action, while that secreted during sleep is convulsant. He showed further that there is not only one urinary poison, but a series, and he demonstrated the presence of seven of them with different physiological properties, and of different degrees of toxicity, viz.: one diuretic, probably urea, not very poisonous; one narcotic, one sialogogue, one myotic, one temperature-reducing, and two convulsants (one an organic, the other an inorganic substance—a potassium compound). Thus, then, he has established the fact that toxic substances are being constantly formed in the economy, and eliminated by different emunctories, especially by the urine; and the sources of the urinary toxicity are to be found in (1) the aliments, especially their potassium compounds; (2) the putrefaction products of the intestine; (3) secretions such as bile, saliva, etc.; and (4) products of tissue metabolism. As to the toxic leucomaines and ptomaines generated in the alimentary canal, they are eliminated in the urine and fæces, or are destroyed by the liver.

In pathological conditions also leucomaines are produced in the economy, and the urine of patients with infectious diseases has been shown by Bouchard (44), Feltz (45), Villiers (46), and

(44). BOUCHARD. Sur la présence d'alcaloïdes dans les urines de certaines maladies infectieuses (Comptes rendus de la société de biologie, 5 Août, 1882).

(45). FELTZ. Académie des Sciences, 1^{er} Avril, 1886.

(46). VILLIERS. Sur la formation des ptomaines dans la choléra (Comptes rendus de l'Académie des Sciences, 12 Janvier, 1885, p. 91): Sur la formation des alcaloïdes dans les maladies (Comptes rendus de l'Académie des Sciences, 20 Avril, et 14 Mai, 1885, p. 1073).

Pouchet (47), to contain alkaloids, which are particularly toxic; and it is a noteworthy fact that when Pouchet was trying to crystallize a basic hydrochlorate of an alkaloid contained in cholera excreta by evaporation over a water-bath, he was seized with toxic symptoms something like those of cholera, chills, cramps, nausea, and anuria, the latter persisting for more than thirty hours. In this connection also the incident related by Carter (48) is interesting, and at least suggestive, describing how Dr. Charles Macallister, the pathologist, and the porter who assisted him in making a *post mortem* examination in a fatal case of uræmia, were seized with faintness, giddiness, diarrhœa, and vomiting, such as occurred in the case of the patient before death.

These recent investigations then would seem to prove that the exciting causes of uræmic symptoms are to be found in various toxic animal alkaloids, which have a selective physiological influence on different portions of the nervous system, such as the cortical motor centres, vaso-motor centre, respiratory centre, etc., quite analogous to the action of the various well known vegetable alkaloids. In accordance with this view, renal asthma, as well as the obviously cerebral symptoms of uræmia, is easily understood.

We now come to the question: Are there any structural lesions produced in the nervous centres, and if so, what is their nature? I have already referred to the œdema and punctiform hemorrhage theories as not being supported by the observations of competent authorities. Certainly there are no gross microscopic changes in the brain or cord; and while in chronic Bright's Disease the vessels of the brain undoubtedly participate in the arterio-capillary fibrosis and increased tension which are characteristic of this form of renal disease, yet such chronic changes can hardly be looked on as the direct cause of uræmic symptoms, while they are altogether absent in many cases of acute uræmia. The only other allusion to microscopic cerebral lesions in these cases is by Popoff, who refers

(47). POUCHET, G. Sur les modifications qui se produisent dans la composition chimique de certaines humeurs sous l'influence du choléra épidémique (in Académie des sciences, 26 Janvier, 1885).

(48). CARTER. Loc cit.

the changes to the accumulation of altered corpuscles within the cerebral capillaries.

I am not aware that this has ever been confirmed until quite recently, and in the following manner:—Dr. A. B. Macallum, of the University of Toronto, wishing to get some sections of the human cerebrum for his class in Normal Histology, took advantage of a *post mortem* examination in the case of a chronic Brightic who died in uræmic coma in the Home for Incurables, thinking, of course, that in a uræmic brain he would find the structure normal. Unfortunately portions only of the brain were preserved, comprising the ascending frontal and parietal convolutions; and most unfortunately we can get no exact clinical history of the case. The pieces were hardened in Erlicki's fluid, and sections from the middle portion of the ascending parietal convolution were stained after Weigert's method⁽⁴⁹⁾, and then in eosin. This gives a particularly good differential stain, the medullary substance of the nerve fibres being colored violet and the axis cylinders brown, while the eosin deepens the color of the nerve cells and the red blood-corpuscles. These sections, however, prepared in this way, some of which I have here this evening, instead of showing the normal histological structure of the cerebral convolutions, show most decidedly that there has been a destructive process going on among the nerve cells and especially in the nerve fibres nearest the white matter. These latter have largely disappeared in some spots, or their place

is taken by rows of black granules; while the capillaries in many parts of the sections are filled with leucocytes fairly loaded with this black matter. In other places the structure seems to be quite normal. Corpora amylacea are also to be seen in considerable numbers in the white matter. Now it is the myelin, or one of its constituents, which is acted on by the Weigert stain; therefore we are to conclude that the nerve fibres and cells are being disintegrated, and the leucocytes are busy as scavengers carrying away the disintegration products. So that we have here a true structural lesion quite sufficient to account for the functional disorders of the nervous system* in uræmia. Neither Dr. Macallum nor myself have had the opportunity of examining any other uræmic brain for similar changes, therefore we cannot claim to have established any new truth in the pathology of the cerebrum. From imperfect observations on this single isolated case, about which nothing is known beyond the fact that the patient died in uræmic coma and that the kidneys were cirrhotic, no deductions of any value can be made. But it points out a line of investigation which, if followed up, will, I am persuaded, lead to important discoveries; for it is only now that we are in possession of a method at all likely to be productive of reliable results in the pathological histology of nerve structures.

Can uræmia appear apart from organic disease of the kidneys? If the real origin of the uræmic symptoms be such as I have endeavoured to indicate, we must consider it quite possible, and indeed highly probable, that such symptoms may arise in many diseases where toxic waste products are accumulated in such quantity that even sound kidneys cannot excrete them rapidly enough. We have such conditions in typhus and typhoid fevers, diphtheria, cholera, and all those diseases where pathogenic micro-organisms play such an important part. The term therefore acquires a much wider significance than it was originally intended to possess, and perhaps the definition given by Carter which I quoted at the beginning of this paper, is as good as any that we could frame, and is sufficiently comprehensive.

CONCLUDING REMARKS.

I. The correct interpretation of uræmic phe-

(49). Weigert's Hæmatoxylin Staining for medullated nerve tissue.

Formulae.—(1). A saturated aqueous solution of neutral copper acetate.

(2). Strong hæmatoxylin staining fluid.

(3). Borax, potassium ferricyanide $\bar{a}\bar{a}$ one drachm, water four fluid ounces.

Process.—(1). Allow the sections to remain in (1) for twenty-four hours. If Erlicki's fluid has been used in hardening, this may be omitted.

(2). Wash in clean water for a few moments only, and transfer to (2). Brain sections require from two to three days, and spinal cord twenty-four hours for complete staining. They must appear almost black. The solution should be kept at a temperature of about 100° F.

(3). Wash in water for five minutes and transfer to (3), where they may remain for twelve hours without harm; but generally an hour will be sufficient.

(4). Wash in water.

(5). Dehydrate gradually with alcohol.

(6). Clear with oil of cloves, and mount if desired in balsam or dammar.

nomena is one of the most difficult problems in pathology.

2. The directions in which the solution of this problem should be sought are, the careful study of the micro-chemistry of the tissues, and especially of tissue metabolism, and the by-products of nutrition; and the investigation of the inter-relation of different organs, e.g., kidney and thyroid, thyroid and brain. We know, for instance, that there is an important physiological relationship between the brain and the thyroid body in connection with cretinism and mucinogenesis; but we know nothing yet of the relationship between the thyroid body and the kidney, or what are the changes, nutritive or otherwise, that may be produced in the former when the latter is not performing its normal functions.

3. A most careful study should be made of the brain and cord by the latest improved methods of microscopic technique, when, I have little doubt, it will be fully demonstrated, that there are structural lesions of the nerve centres in many or all of the cases.

4. Perhaps it is not unreasonable to suggest that epilepsy and other so-called neuroses may depend on the presence of *toxæ* in the blood circulating through the nerve centres, and that there may be structural lesions which have hitherto been undetected; nor should we rest satisfied until we have exhausted every means for disproving that any disease is merely functional.

5. The term *uræmia*, being strictly applicable to only one condition of blood poisoning, is not a good one for designating the well-known group of symptoms; *urino-toxæmia*, or *auto-toxæmia*, would be far better.

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59 AVENUE ROAD, TORONTO.
Feb. 19th, 1889.

EXPLANATORY NOTES ON DR. KEYES' INVESTIGATION OF ELECTROLYSIS.

BY C. R. DICKSON, M.D., KINGSTON.

(Reprinted from *New England Medical Monthly*.)

IN the issue of the *New York Medical Journal* for October 6th, appears a paper read before the American Association of Genito-Urinary Surgeons, at its second annual meeting, entitled, "The Curability of Urethral Stricture by Electricity—An Investigation," by E. L. Keyes, M.D.

On the whole I must say I am glad the paper has appeared at this very opportune time, as it will serve to demonstrate that electricity may fail even in the hands of one of the most skilled of genito-urinary surgeons, for most certainly this is all that it proves.

When a few more such results shall have been given to the expectant profession, the fact will at last dawn upon us that electricity is not the simple, harmless panacea that many of its advocates would have us believe, but on the contrary, requires in its successful application rare tact, judgment and skill, combined with a mature acquaintance with its fundamental laws, such as is to be gained only by plodding, earnest, patient study of it in all its forms, and by experiment in which common sense and physiology have a hearing: for instance, we should not expect the aorta of a dead calf placed between two pieces of beef with a hole punched through the mass, to play the role of an urethral stricture in the living man, as was quite recently reported.¹

Having made this discovery—too late, alas! in many a case—the general practitioner, as well as the specialist, be he genital or urinary, or both, or neither, will, if wise, do one of two things, either settle down to study, investigate and experiment, which will consume much time; or which is the better or at least safer method—let electricity severely alone and send suitable cases to be treated by those who already understand the subject and are known to be successful in their treatment of such cases.

To the student as yet unprejudiced belongs

(1) "An essay read before the Surgical Section of the New York Academy of Medicine upon the limitations of Electrolysis as a Therapeutic Agent in Organic and Spasmodic Stricture of the Urethra, with cases," by F. Tilden Brown, A.M., M.D.—*Journal of Cutaneous and Genito-Urinary Diseases*, July, 1888.

the golden opportunity; let him insist upon practical instruction on the subject by competent teachers, and any labor he may expend on this most attractive branch of therapeutics and surgery will be amply rewarded, and he at least will appreciate and quite understand the difference between removal of adventitious material by sloughing and by absorption.

But I wish to call attention to the rather unfair use made of cases 8 and 9; the criticism of the remainder of the article I leave to others, should they consider it worth their time.

While in New York recently on electrical business, my friend, Dr. Robert Newman, kindly permitted me to see Dr. Keyes' letters in reference to "Case 8, J.D.," and copies of his replies, all of which I read carefully and noted and now propose to give the gist of. Neither of us had seen the complete paper at that time, but only a very meagre synopsis of it in the *Medical Record*.

On January 10th, of this year, Dr. Keyes writes that he is much interested by Dr. Newman's reports, expresses a desire to investigate, asks for information to his assistant, and as to where Dr. Newman's electrode could be obtained. Later, Jan. 21st, he mentions the Mallez-Tripier incident—or, more correctly, accident—says he is incredulous, but "whatever the result may be, I shall give it to the world without fear, simply stating what I conclude after proper investigating;" states that he has instruments ready, and some dispensary cases. He proposes to send one case to Dr. Newman, having first examined, and will examine it again *after Dr. Newman pronounces it cured*, if allowed. Then J.D. is sent with Dr. Keyes' assistant, and Dr. Newman having stated that the case is not a favorable one on account of a previous surgical interference, Dr. Keyes writes on February 6th: "Don't let us go on with the D. case unless you are willing to abide by the result," and offers to look up another case, to which Dr. Newman replies on the 8th: "I do not understand what you mean by saying that I should be willing to abide by the D. case. I am sure the D. case will come out all right if the man does what I tell him. But I attend the D. case for your pleasure and not as an investigation. On the other hand I can refer you to many physicians who have seen patients before electrolysis and

examined years after the cure, and found that no relapse had taken place." But that would be foreign to an *investigation*, so on Feb. 20th, Dr. Keyes repeats his question: "I asked you (and still ask) whether you are willing to accept D. as a test case, etc.," and on the same day Dr. Newman at once answers: "I expect that electrolysis will cure the stricture of D. even if the case was worse. But I cannot agree to have this one patient put up as a test case, when I have hundreds to show and can verify the results—without relapse—by reliable physicians who have examined and re-examined these patients." Dr. Newman also expresses a readiness to call on Dr. Keyes and give a proof of statistics.

A report having been asked for on June 26th, as Dr. Keyes is about to sail for Europe, Dr. Newman replies two days later: "I take pleasure to state the present state of D., whom you sent to me for treatment, for, as you expressed it, 'double linear stricture at $4\frac{1}{2}$ inches.' At the present time this stricture has entirely disappeared. Nevertheless the patient is not well nor cured. I found on examination, when D. first came to me, a second stricture at $5\frac{1}{2}$ inches from meatus, as also contracture of the bladder, which propelled the sound and sometimes caused such spasm that no instrument would pass beyond six inches. There is much irritation and discharge of mucus, pus, and blood from the urethra. This second stricture is improved so that a No. 25 French will pass, but the ring constituting the stricture can be felt distinctly and is not cured at the present time. For the spasm of the bladder he has not received any treatment, and the galvanic current certainly will not cure spasmodic action of the bladder and urethra. I now propose to treat D. for the latter trouble during the hot season, taking time, and report to you later in extenso."

But this would not suit the investigation either, so Dr. Keyes hastens to say on July 2nd: "Will you allow me to ask you not to give D. any further treatment, that I may have an opportunity to examine him again in the autumn, in order to determine his ultimate condition." To this Dr. Newman naturally objects on July 18th: "I wish to call your attention again to my former letter of the 28th of June, in which I said that the case is not cured, and again, that I did

not treat the case with its complications, but only the strictures as desired. And further, as I had not the patient under my sole control, even did not know his residence or whereabouts, the result is not as favorable nor cured as I desire to see it. Please take such circumstances into consideration.

On September 4th, Dr. Keyes writes that he has just returned and proposes to say all he knows about electrolysis in stricture at Washington Congress, and after examining D. will add that to the paper, and on the 13th continues: "I have examined D. and find recontracture, his stricture being at four and a half inches; I cannot find that any improvement has followed the use of electricity, and on close questioning, I learn that his strictured area never had been cut (as he allowed me to suppose), but that the cutting had been a meatotomy. Under these circumstances I see no escape from reporting the case a failure, . . . it seems to me to demonstrate that electricity has signally failed in removing organic stricture in this case."

The last communication is Dr. Newman's reply of September 15th: "In your favor received yesterday you say that the D. case is a proof of failure of electrolysis and that you will report it as such. I certainly will and must protest against such an action as very unfair, as I did already on my visit to you. I have very good reasons for my protest, among which is D. was not 'dismissed by me as cured,' but on the contrary withdrawn by you, and thereby any possibility of a cure prevented. I am so certain of the efficacy of electrolysis in urethral stricture that for public good I am ready to demonstrate the success at any time, if such trial is conducted impartially and in good faith." This certainly seems fair enough and speaks for itself, requiring no comment.

At the personal interview alluded to Dr. Newman tells me he also objected to "Case 9, E.S.E.," being reported, as Dr. Keyes knew that the patient was badly treated by a physician in Brooklyn who used electricity in a wrong manner. Later E. came to Dr. Newman, who refused to treat him. On the patient's asking for the direction of a reputable surgeon, if Dr. Newman did not wish to treat him, he was sent to Dr. Keyes. But Dr. Keyes' plan must not be inter-

ferred with; he cannot well re-write his paper, he tells Dr. Newman, but may state verbally that he has seen him.

The chance to have a sling at electrolysis is too good a one to miss, and Dr. Newman's many friends at home and abroad must have the news brought back to them, that the "Apostle of the Creed" is an imposter, and they themselves have been dreaming, their confidence "due either to the combined credulity of the patient and imagination of the surgeon, or to some special but fortuitous act of Providence upon which, in the case of his own patients, the general practitioner cannot with any confidence rely." And thus the benefactor of his deluded brethren recalls the foolish ones from the hypnotism under which the wicked Dr. Newman has laid them. And if they have not already done so, they will at once read the article recommended by Dr. Keyes, in the July and August numbers of the journal, of his specialty, (2) then will turn back to the editorial in the *New England Medical Monthly* for December, 1887, to remind them of how many like themselves thought all along that they had been curing strictures when they really were quite mistaken. And our papers will be filled with recantations from Drs. J. H. Kellog, of Battle Creek, T. H. Burchard, of New York, J. J. Berry, of Portsmouth, N. H., and a host of others. Of course Dr. Newman is too hardened; no hope for him; he will doubtless remain an outcast from the realms of orthodox surgery of the urethra. But across the pond, F. Swinford Edwards, F.R.C.S.E., London, will doubtless hasten to inform us that his communication in the *Medical Press and Circular* of April 11th was misleading, and all his favorable cases have relapsed since reporting.

And the foolhardy practitioner who asks for urethral electrodes at the instrument dealer's will be withered with a glance of scorn, referred to a museum, and offered an improved urethrotome on three months' trial and easy payments, with a liberal discount for cash.

But joking aside, for stricture is no joke, why not have the demonstration offered by Dr. Newman? Its success or failure would do more than anything else—including *investigations*—to

(2) *Ibid.*

fix the status and scope of electricity in urethral troubles, and save a great deal of valuable time and printer's ink, only taking care to first agree upon three points: (1) What constitutes a normal urethra? (2) What constitutes a stricture? (3) What a cure?

It is not greatly to our credit as a progressive profession that while in the commercial world such advantage has been taken of the rapid strides of electricity as a science with fixed laws, so many of our number look upon it with discredit, call its advocates "cranks," or perchance try it only to fail.

172 JOHNSON STREET, KINGSTON, ONT.

Selections.

SALICYLIC ACID IN DIPHTHERIA.—D'Espín finds that salicylic acid, in solutions of 1-2000, is an excellent parasiticide for the diphtheritic bacillus; while its harmlessness in respect to the animal tissues allows it to be freely and frequently used. It is also a useful prophylactic.—*Revue Méd de la Suisse Romande: Medical Times.*

THE DOSE OF MALE FERN.—The dose of liquid extract of male fern given in the *British Pharmacopœia* is ℞v to ℞xxx. That this is much too low appears to be generally recognized. Dr. Bristowe, in his *Theory and Practice of Medicine*, gives the dose as ʒ ss to ʒ ii; in Fagge's *Principles and Practice of Medicine* the dose in use at Guy's Hospital is stated to be ʒ i to ʒ iss; Professor Gerhardt recommends for tœnia mediocanellata ʒ iiss to ʒ iii, for tœnia mediocanellata ʒ iiiss to ʒ iv. Dr. J. O. de Man, of Middelburg, Holland, gives a list of twenty-seven cases treated with even more heroic doses; the largest dose he records was rather more than ʒ i (32 grammes), but about ʒ vi would seem to be his usual dose for an adult, and he gives from ʒ iii to ʒ ss to a child of 12. Although Dr. de Man states that he observed no unpleasant symptoms follow these large doses, it is not quite clear that they are entirely free from danger. A fatal case has been reported from Ceylon: a man took a draught containing ʒ iiss of liquid extract of male

fern in two doses of six drachms each at an interval of three or four hours; violent vomiting and purging ensued, and the patient died in a few hours.—*British Medical Journal.*

ABORTIVE TREATMENT OF ACUTE PLEURISY WITH DIURETICS AND DRY DIET.—The following is taken from one of Da Costa's clinical lectures published in the *Medical Times*:—

This man, 41 years of age, was admitted only two days ago (Jan. 3). He stated that he had had a chill on the day before, followed by fever and pain of a very severe character at the lower part of the right chest, making it impossible for him to take a long breath, and checking his cough. He had a temperature of 102° on admission, and was very restless on account of the pain in his side, which was excruciating and increased by the slightest movement of his body. We found slight impairment of resonance over the lower half of the right lung, anteriorly, with feeble breathing—probably because he voluntarily checked respiration on account of the pain—and we also detected pleural friction at the end of inspiration. I bring this case before you solely to show you the results of treatment. It is now the third day of the disease, and his temperature is normal. He can breathe without pain and he slept all last night without anodyne. Upon percussing his chest this morning, I still find relative dullness at the right base, and some friction-sounds are still audible; but I can hear the vesicular murmur beneath and there is no effusion. When he was admitted his right chest was thoroughly cupped, and a few ounces of blood were taken with two wet cups. He was given two grains of Dover's powder every two hours, with at first a mercurial, and then forty grains of acetate of potassium every two hours, or at the rate of an ounce a day. The object of this treatment was to act freely upon the kidneys and prevent effusion, and this was favored by restricting the amount of liquids given him. The chest was enveloped in cotton. The result has been all that could have been desired. The patient is convalescent. If needed, he can have five grains of Dover's powder at night, although he slept very well last night without anything.

USES OF BORACIC ACID.—Dr. Lebovitz, in the *Wiener Med. Presse*, narrates some uses to which he has put boracic acid.

1. Boracic acid acts antiseptically. Every soldier should carry one ounce of it in his overcoat pocket, and a handkerchief cut into two triangles for necessary bandages. Simply sprinkling a wound with finely powdered boracic acid suffices to insure rapid healing. This remedy being odorless and itself absorbing all odors, the author has used it advantageously in abscesses, ulcers of the feet, caries and necrosis of the bones, and in complicated fractures.

2. In anthrax and after the incision of furuncles it acts well when applied directly to the parts. Forming furuncles should be painted several times daily with the following:

R.—Boracic acid } - - aa equal parts.
Water }

3. In burns, when the flesh is exposed, it is necessary to be careful with poisonous antiseptics. Boracic acid possesses the advantage of being non-poisonous. He covers the burnt surfaces with a boracic vaseline ointment in the proportion of one to five:

R.—Boracic acid (finely powdered) 20 parts.
Glycerine - - - - - 15 "
Mix, and add,
Vaseline - - - - - 85 "
—M.

Apply twice daily.

In severe burns with fever, the author combated the fever by the internal administration of the following:

R.—Boracic acid - - - - - 4 parts.
Glycerine - - - - - 10 "
Water - - - - - 100 "
Syrup of poppies - - - - - 25 "
—M.

Sig.—A teaspoonful every two hours.

4. For coryza:

R.—Boracic acid (finely powd.) } equal parts.
Powdered coffee }

Use as a snuff.

5. In some cases of chronic endometritis with leucorrhœa and sterility, the uterus was filled with powdered boracic acid, and then a boracic acid tampon applied. After removing the tampon, the cavity was irrigated with a boracic acid solution. A cure was generally effected after a

three or four months' treatment, in some cases conception following.

6. In cystitis the bladder was washed out (in acute cases) with a three per cent. boracic acid solution, and in chronic cases this treatment was followed by the internal administration of from forty-five to ninety grains of boracic acid.—*Deutsche Med. Wochenschrift: Med. News.*

THE
Canadian Practitioner.

A SEMI-MONTHLY REVIEW OF THE PROGRESS OF
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Contributions of various descriptions are invited. We shall be glad to receive from our friends everywhere current medical news of general interest.

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THE CURETTE IN PUERPERAL
ENDOMETRITIS.

AN interesting paper on the treatment of puerperal endometritis was recently read by Dr. E. H. Grandin to the Medical Society of the County of New York, and was reported in the *New York Medical Journal*. He supposed septicæmic endometritis to be in the majority of cases localized at the onset, and due to the retention of portions of placenta or shreds of membrane, although he by no means thinks that septicæmia will necessarily follow such retention. In the treatment of such a condition he believes that the majority of accoucheurs, the world over, use the uterine douche, while a minority practise expectancy. He considers the douche troublesome and inefficient in a large proportion of cases, as well as dangerous from the poisoning when antiseptics are used.

His own method in such cases is substantially as follows: When fœtor of lochia appears a vaginal douche is given which is expected to remove it when due to decomposition of a clot in the vagina or some such cause. If the fœtor recur an intra-uterine douche is administered.

If after this the foetus reappear the patient is put in Sim's position, the speculum is inserted, the anterior lip is hooked with a tenaculum, and the endometrium is thoroughly scraped with a dull curette. The patient is then turned on the back and an intra-uterine douche is administered, which seldom has to be repeated.

There is no doubt that in many cases of septic endometritis the curette is an admirable instrument to use; but at the same time we think Dr. Grandin has given it too much prominence. He should never forget that in a large proportion of cases where we are called on to remove portions of membranes or placenta, no instrument yet invented is equal to the educated finger. It frequently happens that the fingers remove debris after failure with the use of the curette. Let us ever keep in mind the fact that if we must interfere we have various procedures to choose from, especially the douche, the fingers and the dull curette. This is the broader as well as the more conservative way to consider the matter, and is by no means new. Dr. Grandin, while endeavoring to prevent obstetrics from "standing still," will have made no advancement if he leads us to forget that Providence has given us fingers which were intended to be used.

It is not easy to give definite rules on the subject. In this issue we have a report of a case at the Burnside Lying-in Hospital, where the curette was used with marked benefit; but, within a short period, portions of retained placenta, or membranes, or both, have been easily removed several times by the fingers. In the majority of cases we think the fingers are better than any instrument; but it may be that the curette is preferable when there is considerable soft, half liquefied debris, covering a considerable extent of surface, if an intra-uterine douche has been previously administered without good results.

RECENT APPOINTMENTS IN THE UNIVERSITY OF TORONTO.

ON behalf of the Medical Faculty of the University of Toronto, we beg to refer to certain statements made by one of the contributors to the recent attack on the venerable and distin-

guished President of the University. "Medicus," in a letter to the *Mail* referring to the alleged opposition of Sir Daniel Wilson to the appointment of Dr. MacCallum to the lectureship on Physiology, says: "I can inform the President of University College that the Medical Faculty have not forgotten nor forgiven his unwarranted interference in that appointment. With due regard to future appointments, and in consideration of the interference of the Arts Faculty, through its head, with the interests of the Medical Faculty, it is of imperative necessity that something should be done to prevent this interference and to guard the interests of the Medical Faculty from future assaults. . . ."

In reply to this we have to say that "Medicus" makes a grave mistake, as the Medical Faculty, since its re-establishment, has had no more cordial and generous supporter than Sir Daniel Wilson. At all meetings of the Senate the medical representatives have ever received the kindest consideration from Sir Daniel and every representative of the Arts Faculty. The same generous treatment has been accorded by the other members of that body without exception. We are pleased to state that in no single instance have the wishes of the medical representatives met with opposition from any quarter.

We have no intention to discuss the merits of the various cases brought forward in the recent newspaper correspondence, but we must express our deepest regret at the attacks which have been made, and the methods employed, which we consider by no means creditable to the various anonymous contributors. While Sir Daniel is of necessity prevented from defending himself it is not manly to strike him with bludgeons.

We do not approve of the method of making these appointments. To those who agree with us in this particular we may say that the Government alone is responsible, and not Sir Daniel. We do not object to recent appointments, but we desire to see a change in the manner of making them. There should be more sympathy and a better understanding between the Government and the authorities of the University. Without offering any criticism on the acts of the present Government, which, we are certain, has the best interests of the University at heart, we fear that

there may be in the future a serious danger of disastrous results. In this connection we have no reference to the Medical Faculty, as the Government has granted to the Senate the power of recommending all appointments to this Faculty.

THE ONTARIO MEDICAL ASSOCIATION.

THIS Association will hold its next annual meeting in Toronto, on the 5th and 6th of June next. We are informed by the Secretary that several papers have already been promised which may be expected to prove attractive to the profession, among others one by Dr. Skene, the well-known Dean of Long Island College, N.Y., and another on "The Radical Cure of Hernia," by Dr. Roswell Park, of Buffalo.

Several new and a few old friends from across the border, and from the neighboring Province of Quebec, may be expected to lend interest to the proceedings.

It depends, however, upon the members of the Association at large, whether or not the coming meeting will be a success. Unless there is abundant material offered, and unless the papers to be read are prepared with care and earnest work, the Association must fail to fulfil its true end, the advancement of medical science in Ontario.

The special committees were appointed early in the year, and all their members have announced the intention to take up the work allotted to them.

Obstetrics and Gynecology.—Dr. Griffin, Hamilton, chairman; Dr. Barrick, Toronto; Dr. Fenwick, Kingston; Dr. Adam Wright, Toronto; Dr. Howitt, Guelph. Subject for discussion, "Lacerations of the Perinæum."

Medicine.—Dr. Shcard, Toronto, chairman; Dr. McPhedran, Toronto; Dr. Moorehouse, London; Dr. Tye, Chatham; Dr. Bruce Smith, Seaforth. "Subject for discussion, "The Prognostic Significance of Moderate Cardiac Hypertrophy."

Surgery.—Dr. W. T. Aikins, Toronto, chairman; Dr. Cameron, Toronto; Dr. Ruttan,

Napanee; Dr. Dupuis, Kingston; Dr. Wishart, London. Subject for discussion, "The General Management of the Patient and Sick-room in Surgical Cases."

Therapeutics.—Dr. Thorburn, Toronto, chairman; Dr. Oliver, Kingston; Dr. Davison, Toronto; Dr. Meek, London; Dr. Wishart, Toronto.

Ophthalmology.—Dr. Moore, Brockville, chairman; Drs. Reeve, Burnham, Ryerson, and Palmer, Toronto; Dr. Connell, Kingston. Subject for discussion, "Glaucoma."

The officers for 1889 are:—President, Dr. W. H. Henderson, Kingston. Vice-Presidents: Dr. W. B. Geikie, Toronto; Dr. Howitt, Guelph; Dr. Day, Trenton; Dr. Aikman, Collingwood. Corresponding Secretaries, Dr. Lovitt, Ayr; Dr. Gillies, Teeswater; Dr. Trimble, Queenston; Dr. Leonard, Napanee. General Secretary, Dr. D. J. Gibb Wishart, Toronto. Treasurer, Dr. N. A. Powell, Toronto.

ST. JOHN'S HOSPITAL FOR WOMEN.

THIS hospital has existed in Toronto for about three and a half years, and has been doing very good work. It is conducted entirely by the Sisters of St. John the Divine—the only Church of England Sisterhood native to Canada. Up to the present time the building used was situated on Euclid Avenue. Soon after the opening of the hospital this building was found to be too small, and lately admission has of necessity been refused to many. There were under treatment as in-patients altogether 245 patients, and 48 major operations.

A new building has been erected and is just completed on Major street, which will accommodate thirty patients for the present, with possibilities of enlargement in the near future if required. It is supplied with the best methods of heating, ventilating and lighting. There will be one free ward, two small wards with five beds each for \$5 per week, and a number of private rooms for \$8 to \$18 per week. Only those suffering from diseases peculiar to women will be received, and especially those requiring serious surgical operations.

NOTES.

ALEXANDER'S OPERATION.—Prof. Gill Wylie, of New York, thinks Alexander's operation of shortening the round ligaments rarely necessary.

A CHAIR for physical examination for life insurance has been created in the University of Vermont. Dr. Stillman has been elected to the position.

THE CANADIAN PRACTITIONER comes to us this year as a semi-monthly. It is even better filled than when a monthly with sound and able material and interesting medical news.—*Quarterly Review of Narcotic Inebriety.*

KAPOSI (*Medical Age*) says that a solution of one part of corrosive sublimate in thirty parts of collodion, painted on and around the base of a wart, will in a short time cause the excrescence to disappear.

A WEALTHY sugar manufacturer of Odessa, who died recently of typhoid fever, sent, a few days before his demise, to Vienna for Prof. Nothnagel, for whom a special train was ordered. The fee given to the noted professor is stated to have been \$7,000.

WE fear it will take some time (*N. Y. Medical Record*) to educate the profession up to the point of demanding that a surgeon, in the country at least, shall keep to surgery alone, holding himself as a mere consultant, with no clientele of his own, and yet the signs are not wanting that such a change is beginning to be effected.

DR. LOOMIS, of New York city, has been sued by the widow of the late Dr. Miller, to compel him to pay for certain literary work said to have been done for him by Dr. Miller. The work in question is stated to be the paper read before the Association of American Physicians on "The Cardiac Changes in Chronic Bright's Disease."

MICHIGAN STATE MEDICAL SOCIETY.—The twenty-fourth annual meeting of this society will be held in Kalamazoo on the 9th and 10th of May. In addition to the Annual Address of the

President, Dr. S. S. French, other addresses are promised from the Orators of Sections, as follows:—Henry F. Lyster, M.D., Detroit. Subject: "The Influence of Mind in the Cure of Disease." Herman Keifer, M.D., Detroit. Subject: "Surgery within the last Fifty Years." E. W. Jenks, M.D., Detroit. Subject: "The Education of Girls from a Medical Standpoint."

IN our advertising columns may be observed a notice from Dr. Holford Walker informing the profession of his intention to return to Toronto about the middle of May, and having his Hospital ready for the reception of patients by the end of the month. We understand the Doctor has engaged the head nurse of the Woman's Hospital in Birmingham, where she has held the position during the past seven years. His former head nurse has spent the past winter at the Orthopædic Hospital, in Philadelphia, under Dr. Weir Mitchell, and will return to look after the welfare of the Neurasthenic cases.

THE *Provincial Medical Journal* (Leicester) for January contained an article by Dr. C. R. Dickson, of Kingston, to which it referred as follows: "Electrolysis. We recently published an account of Dr. Keyes' experiments on 'the Treatment of Urethral Stricture by Electrolysis,' which were unfavorable to the methods at all points. We prognosticated that Dr. Newman would hardly be content to allow Dr. Keyes' operations to pass without protest, and we publish a reply which has been kindly forwarded to us by Dr. Stevenson. The accumulative evidence in favor of Dr. Newman's plan cannot be disposed of by the simple *ipse dixit* of any individual surgeon however eminent, and we therefore commend to our readers' attention Dr. Dickson's paper."

Obituary.

R. PALMER HOWARD, M.D., LL.D.

THIS country has seen no higher type of a physician than the late Robert Palmer Howard, M.D., LL.D., of Montreal, who died March 28th from pneumonia. Dr. Howard was born in Montreal, of Irish parentage, in January, 1823. He commenced

practice in Montreal in 1849; was appointed Teacher of Clinical Medicine in McGill in 1856, and Professor of Theory and Practice of Medicine in 1860. He held the latter position up to the time of his death. He received the degree of LL.D. from the McGill University in 1886.

He was singularly successful both as a teacher and practitioner. He had been so active in both spheres, until a few days ago, that his friends expected that there were many years of usefulness still before him. His death has given a sad shock to his host of personal friends in all parts of the Dominion. He will especially be missed by McGill Medical College, to which he was a tower of strength. He was one of the strongest supporters of the Canada Medical Association, and one of its past Presidents. Among his many positions of distinction in various other medical societies, one of the most honorable was that of Vice-President of the Association of American Physicians. He will long be remembered as one of the brightest of Canadian lights—a physician who would have done honor to any country in any age.

Meeting of Medical Societies

ONTARIO MEDICAL ASSOCIATION.

THE following is the list of the committees appointed for the coming meeting of the Association:—

Committee on Papers and Business.—Dr. Graham, Toronto, Chairman; Dr. Mullin, Hamilton; Dr. Powell, Toronto; Dr. Groves, Fergus; Dr. A. A. Macdonald, Toronto.

Committee on Arrangements.—Dr. Bryce, Toronto, Chairman; Drs. Wagner, Temple, Spencer, Grasett, Simpson, Macfarlane, Pyne, O'Reilly, Machell, Davidson, Acheson, Ferguson, Burritt, Grafton, Thistle and Cunningham, Toronto.

Committee on Necrology.—Dr. W. H. B. Aikins, Toronto, Chairman; Dr. J. A. Watson, Toronto; Dr. Whiteman, Shakespeare; Dr. Logie, London; Taylor, Goderich; Smith, Toronto; Walker, Toronto; Grant, Beaverton;

Roe, Georgetown; J. Caven, Toronto; Lindsey, Strathroy; Hunt, Clarksburg; Eakins, Belleville.

Committee on Audit.—Dr. Kitchen, St. George, Chairman; Dr. Gullen, Toronto; Dr. Hillary, Aurora; Dr. Lundy, Preston; Dr. Millar, Toronto; Dr. McKinnon, Guelph; Dr. A. J. Johnson, Toronto; Dr. Sinclair, St. Mary's; Dr. Yeomans, Mount Forest; Dr. Machell, Owen Sound; Dr. Philip, Brantford; Dr. McDonagh, Toronto; Dr. McCallum, London; Dr. Millman, Kingston.

Committee on Coroners' Inquest.—Dr. J. H. Richardson, Toronto, Chairman; Dr. Irwin, Kingston; Dr. Johnson, Toronto; Dr. Philp, Hamilton; Drs. C. W. Covernton, White, Duncan, Cameron and Powell, Toronto.

Committee on Credentials.—Dr. A. Davidson, Toronto, Chairman; Drs. R. A. Pyne, W. H. B. Aikins, Armstrong, Britton, Barrick, Duncan, Elliot and Carveth, Toronto; Dr. Arnot, London.

Committee on Nominations.—Dr. McKay, Woodstock, Chairman; Dr. Brown, Galt; Dr. Holmes, Chatham; Dr. Mullin, Hamilton; Dr. A. H. Wright, Toronto; Dr. Smith, Seaforth; Dr. Aylesworth, Collingwood; Dr. Yeomans, Mount Forest; Dr. Powell, Toronto; Dr. Harrison, Selkirk; Dr. McPhedran, Toronto; Dr. Eccles, London; Dr. Mitchell, Enniskillen; Dr. Fenwick, Kingston; Dr. Moore, Brockville; Dr. Taylor, Goderich.

Committee on Public Health.—Dr. Shaw, Orillia, Chairman; Dr. Mearns, Petrolia; Dr. Meek, London; Dr. Wilson, Richmond Hill; Dr. Howitt, Guelph; Dr. Carmichael, Mount Pleasant; Drs. Bryce and T. S. Covernton, Toronto; Dr. Shaw, Hamilton; Dr. Worthington, Clinton.

Committee on Legislation.—Dr. Strange, Toronto, Chairman; Drs. C. W. Covernton, Cameron, Miller and Cleland, Toronto; Hon. M. Sullivan, Kingston; Dr. Kitchen, St. George; Dr. Lundy, Galt; Dr. Herod, Guelph; Dr. Millar, Hamilton; Dr. Colver, Waterford; Dr. Cochrane, Omemee; Dr. Forest, Mount Albert; Dr. Whiteman, Shakespeare; Dr. Griffin, Brantford; Dr. Irving, Kirkton.

Committee on Publications.—Dr. Anderson, Millgrove, Chairman; Dr. Caldwell, Lakefield; Dr. McAlpine, Lindsay; Dr. McLay, Aylmer; Dr. Philp, Hamilton; Dr. Smith, Orangeville;

Dr. Winskill, Brantford; Drs. Peters, Davison and Ferguson, Toronto; Dr. Stalker, Ridgetown; Dr. Powell, Toronto.

Committee on By-laws.—Dr. Roseburgh, Toronto, Chairman; Drs. Cotton, Coatsworth, Doolittle, E. E. King, Ghent, Gullen, Geikie and Bingham, Toronto; Dr. Cruickshank, Ellesmere; Dr. Freel, Stouffville; Dr. Burgess, Leslieville; Dr. McGuire, Guelph; Dr. Macdonell, Orillia; Dr. Ames, Brigiden.

Committee on Ethics.—Dr. Atherton, Toronto, Chairman; Drs. Barrick, Baines, McCullough, O'Reilly, Strathy, Sweetnam, Smith and Spencer, Toronto; Dr. Sturgeon, Hagersville; Dr. Marquis, Brantford; Dr. Gavillar, Grand Valley; Dr. Mitchell, Enniskillen; Dr. Sheard, Toronto; Dr. Digby, Brantford.

Special Committee on Code of Ethics.—The same as the above Committee on Ethics, with the addition of Drs. Burnham and Wishart, Toronto.

Advisory Committee.—Dr. Moore, Brockville, Chairman; Hon. M. Sullivan and Dr. Henderson, Kingston; Dr. Day, Trenton; Drs. Richardson and White, Toronto; Dr. Malloch, Hamilton; Dr. Harison, Selkirk; Dr. Eccles, London; Sir James Grant, Ottawa; Dr. McLean, London.

Hospital Reports.

BURNSIDE LYING-IN HOSPITAL IN CONNECTION WITH THE TORONTO GENERAL HOSPITAL: TWO CASES UNDER THE CARE OF DR. ADAM WRIGHT.

REPORTED BY DR. W. C. BARBER.

CASE I. THROMBUS OF THE VULVA.

PATIENT confined at Burnside Hospital on the morning of the 12th December, by Dr. Thompson. The labor was very protracted and difficult. Twelve hours after delivery considerable swelling of the labia was first noticed, which increased very rapidly, in twenty-four hours extending from the pubes to sacrum. The parts became very tender and painful. The extravasation of blood extended well up the buttocks and to the cellular tissue of the iliac fossa. Dr. Adam Wright was called in, and the patient being anaesthetized, he made an incision two-and-a-half inches long in right labium, removing a coagulum the size of a

large cocoon. The wound was syringed out with hydrarg. bichlor., 1-2000. The parts were dusted with iodoform and a pledget of absorbent cotton dipped in 1-1000 hydrarg. solution inserted. Antiseptic pad and bandage applied to guard against hemorrhage. No hemorrhage ensued. The wound was afterwards syringed with a 1-1000 bichloride solution and ordinary antiseptic dressings applied every six hours. The wound healed in two weeks without the formation of one drop of pus. There was no elevation of temperature at any time above $99\frac{2}{3}$, which occurred on the evening of 6th day. The patient was discharged from the hospital on the 21st day after confinement, perfectly well.

CASE II. CURETTING IN SEPTIC ENDOMETRITIS.

PATIENT was confined at the Burnside Lying-in Hospital Feb. 25th. On the 4th day the lochia became offensive and the temperature went up to 102.4° . Dr. Adam Wright was called in and curetted the uterus with blunt curette, removing shreds of placenta in all about the size of a marble, which were very offensive. The uterus was then washed out with boiled water, temperature 112° , and pads of antiseptic gauze wrung out of hydrarg. bichloride solution, 1-2000, applied over vulva and changed every hour. The temperature rapidly came down to normal. The discharge became slightly offensive twice after the curetting, when small vaginal douches of creolin, $\bar{3}$ ss. to the pint, were given. The highest temperature was 102.4° , and the patient was discharged on the 14th day after delivery.

Note.—The general symptoms and character of the debris removed were such as to cause grave alarm. The manner of recovery was exceedingly satisfactory. I think it may fairly be inferred that this was largely due to the curetting. I could not discover the source of the sepsis. Fortunately septicaemia is very rare in the Burnside.—A.H.W.

Correspondence.

THE DANGERS OF ANTIPYRIN.

Editor of CANADIAN PRACTITIONER.

DEAR SIR:

In the last number of the PRACTITIONER a correspondent speaks of antifebrin and antipyrin as dangerous in large doses when there is

much elevation of temperature. I have also noticed the same statement by other writers before, but none of them explained what serious consequences are likely to follow their use under the circumstances named. Will you kindly explain in your next issue for the benefit of a

YOUNG PRACTITIONER.

THOMPSON, DAK., March 12th, 1889.

In reply, we may say briefly that doses of from thirty to forty-five grains have not unfrequently caused facial cyanosis, disturbed respiration and circulation, and collapse, occasionally terminating in death. With such symptoms we would naturally infer that its use is accompanied with grave dangers in any diseases associated with serious feebleness, and the experience of many observers has proved that such is the case. As we pointed out not long ago in the PRACTITIONER it is especially dangerous in such diseases as typhus fever, puerperal or other form of septicaemia, or in almost all diseases accompanied with high temperature, such as pneumonia, typhoid, rheumatism, etc., when there is grave general depression. In all such the dangers are greater when there is organic embarrassment of heart, lungs or kidneys. The dose for the adult should not exceed twenty grains, to be repeated when necessary every hour or two, until forty to sixty grains in all be given.

Miscellaneous.

AN absent-minded doctor recently took unto himself a wife. During the marriage ceremony, when she held out her hand for the ring, he felt her pulse and requested to see her tongue.

SUICIDE OF PROFESSOR SOYKA.—Professor Soyka (*Medical Record*), of Prague, shot himself through the head with a revolver in his house in Prague on the 23rd ult. Professors Gussenbauer, Kahler and Pick, who were called immediately, found Dr. Soyka still alive, but he died soon afterward. He had suffered from extreme nervous irritability since the death of his brother, a distinguished lawyer, who died in a lunatic asylum in Vienna last year. On the table of the room in which Professor Soyka committed the fatal act, a slip of paper was found on which

he had written the following words: "Dear Brother, I follow you. Where thinking ceases, shooting begins. It is better to die than to go mad."

THE craze for spaying women is fast dying out in New York. It is now conceded by the most aggressive gynecologists here that the operation has been fearfully abused. There can be no doubt that the operation is sometimes necessary, but the wholesale sacrifice of ovaries that was once so prevalent here, and from whence some of our Western gynecologists caught the infection, is a thing of the past. I have seen two cases here, but in each the ovaries were extensively diseased and the tubes distended with pus. They were a constant source of pain and sickness to the patients, who were incurably sterile, and the proper thing to do was to take them out. But they presented a striking contrast to the normal tubes and ovaries that I have seen exhibited, in times past, to the Marion Country Medical Society.—New York Correspondence of the *Indiana Medical Journal*.

Personal.

DR. PRICE BROWN will shortly remove to 39 Carlton Street.

DR. HOWARD, Dean of the McGill University Medical College, is dead.

DRS. EDMUND E. KING and W. Beattie Nesbitt have been appointed to the staff of the House of Providence.

IN the report of the proceedings of the Toronto Medical Society it was mentioned that Dr. A. R. Robertson was elected an honorary member of the Society. It should have read Dr. A. R. Robinson, of New York City (248 w. 42nd street).

Births, Marriages & Deaths

BIRTH.

ORTON.—At Guelph, February 9th, the wife of Dr. R. Orton, of a son.