

probably represent but a partial truth. The completer statement probably should be that elements and groups of elements retain more or less of their individuality throughout their combinations, and this would surely apply to either side of a salt—the base and the acid. The value of such statement would be as a help towards classification.

Next, that under these simple conditions specified, a certain relation between potassium, sodium, and ammonium salts is manifest. Potassium standing first as most poisonous and threatening in two directions; ammonium coming next, its action being restricted to destruction of contractility; sodium coming last and ranking as but very slightly poisonous comparatively with either. These experiments, indeed, would make potassium salts some fourteen or fifteen times as poisonous as sodium salts. Is the conclusion not warranted that in their action on the muscular tissue of the ventricle, and on its intrinsic nervous apparatus, these salts will maintain a *like* relation, even though the conditions be the more complex and indefinite ones of the organism in its entirety? It is not that one would exclude action on the nerve centres, vagus, &c., from the effect witnessed on the entire organism, but that one would specify *one* from among the many factors in the equation. This relation of the salts of potassium, sodium, and ammonium has however been tested on other tissues, and found to hold—e.g., on the nervous system.<sup>4</sup> The results also with the entire organism show that whilst potassium salts are very poisonous, sodium salts can scarcely be made to kill.

Insistence has already been made in various quarters on the use of sodium and ammonium salts in preference to potassium salts; more especially has this been urged for the bromides.<sup>5</sup> (The bromide of sodium has been rather largely used in America.) Clinical evidence must obviously give the final judgment; but have we not here clear indication as to the lines on which clinical investigation should be pursued?—the suggestion being that salts of sodium should throughout be substituted for those of potassium and ammonium, till clinical evidence decide that the action of one or other of these bases is required in the particular case under treatment? This suggestion, then, is based not only on the results of experiments with the entire organism, but also on these more definite results gained from experiments on isolated tissues.

It may be added that both at the Children's Hospital, Great Ormond-street, through the kindness of Dr. Barlow, and at the Western General Dispensary, Marylebone, we have had the opportunity of trying the chlorate of sodium<sup>6</sup> in cases of stomatitis, with ulceration along the edges of the gums, but few cases up to the present have been collected. So far, however, the evidence in its favour is every bit as unequivocal as it is for potassium chlorate, which might be said to be one of the show drugs in therapeutics. Two of the cases gave the best kind of evidence obtainable; they were, namely, cases of relapse, and were cured by pushing the drug.

## NOTE ON THE CLINICAL CHARACTERS OF TUBERCLE IN BONE.

By WM. SCOVELL SAVORY, F.R.S.,  
SURGEON TO ST. BARTHOLOMEW'S HOSPITAL.

It is curious on reflection to see how many striking points of analogy there are between the progress and effects of tubercle in lung and in bone. In the first place the cancellous texture of bone, which is the seat of tubercle, resembles broadly in physical characters the parenchyma of lung. A section of cancellous bone and a section of dried lung have to the naked eye a very general resemblance. The structure of both is aptly described as sponge-like, and this resemblance is drawn more closely when a mass of yellow tubercle occupies the substance of each. In both cases the

spongy texture appears to be filled up and rendered solid by the infiltration of the caseous deposit. Then, too, the resemblance further appears in the halo of inflammation or increased vascularity of varying width which so often surrounds the mass. Still further is the likeness shown in the mode in which the tubercle degenerates. The included tissue is broken down and destroyed until, either by the escape or disappearance of the tubercle, a cavity is left in the cancellous bone corresponding very remarkably to a vomica in the lung. Furthermore, the likeness is extended by the relation of cancellous bone to a neighbouring joint and the relation of lung substance to the pleura. Just as pleurisy is so often set up by the disturbance of tubercle in the lung, so synovitis is often provoked by the disturbance of tubercle in adjacent bone; and just as empyema is sometimes produced by the perforation of the lung-wall and the escape of matter into the pleural cavity, so suppuration in a joint, which is too often destructive, is due to the perforation of the articular wall of bone and the escape of matter into the synovial cavity. In either case urgent symptoms are apt to supervene suddenly on comparatively latent mischief.

Then, I think, the variable progress and effect of tubercle in the lung are oftentimes repeated with singular resemblance in bone. This first struck me many years ago in studying the graphic picture which Dr. Latham drew of the various forms of phthisis in his masterly Lectures on Clinical Medicine, which, by the way, have been happily reproduced by the Sydenham Society under the editorship of Dr. Martin. Just as in lung, so in bone; the history of tubercle is sometimes that of a single formation, which passes steadily, with more or less rapidity, to destruction; sometimes that of several smaller ones simultaneously; sometimes, though this more rarely, that of a number of successive formations which pass through their stages one after another, leading in this way to a gradually extending destruction of osseous tissue. So, again, and in this I think the resemblance is most marked of all, there are in tubercle in bone phenomena very exactly corresponding to what Dr. Latham in the lung, and in the cervical glands as a more obvious illustration, has described as cases of mixed and unmixed phthisis. In one class, during the changes which tubercle, after its formation, is prone to undergo, there is only what may be called a necessary amount of inflammation excited in the surrounding texture, such as is just sufficient to accomplish the result of softening and expulsion, and which subsides as soon as that is effected. This Dr. Latham called the specific limit of the disease. In another class the inflammation provoked spreads widely and deeply beyond this, and becomes much more severe and extensive than is needful for the mere elimination of the tuberculous matter. In short, Dr. Latham's sketch might have been drawn from a study of tubercle in the head of the femur or tibia or in the tarsus or vertebrae.

Within the whole range of pathology I know no better illustration of the value of extended study, or rather of the great loss from limited views which must come of too special observation. For the study of tubercle, if the difficulty would be adequately grasped, must be carried on not only throughout the whole fields of medicine and of surgery, but here, at all events, there can and ought to be no boundary between them. For the largest purpose, the land to be explored must be common to both.

Brook-street, W.

## ANOTHER NEW TEST FOR ALBUMEN.

By GEORGE JOHNSON, M.D., F.R.S.,  
PROFESSOR OF CLINICAL MEDICINE AND SENIOR PHYSICIAN TO KING'S  
COLLEGE HOSPITAL.

MY son, G. Stillingfleet Johnson, in a paper published in the *Journal of the Chemical Society* (August, 1874) describes some compounds of albumen with the mineral acids, and gives a table showing the action of various chemical reagents in causing coagulation in solutions of these albumen compounds. He found that only two reagents besides the mineral acids cause the coagulation of albumen in solutions of all its acid compounds—namely, baric chloride and picric acid,—and he suggested to me that the latter of these two substances might be found a useful test for albumen in the urine; for while the baric chloride could not be added to normal urine without being precipitated by many of its

<sup>4</sup> Ringer and Murrell: *Journal of Anatomy*, vol. xii., p. 71. For further reference see also Wood's *Therapeutics*; articles Potassium Salts; also Phys. Action of Sodium and Ammonium Bromides. Third edition, 1881.

<sup>5</sup> See Wood's *Therapeutics*, Bromide of Sodium. Also paper on Epilepsy with Cardiac Complications, by W. A. Hollis, M.D., *Practitioner*, vol. xxii., p. 81.

<sup>6</sup> Through the kindness of Mr. Martindale we were provided with a pure specimen of this salt.

normal constituents—sulphates, carbonates, and phosphates—picric acid causes no precipitate in normal urine.

Acting upon my son's suggestion, I have for some months used a saturated solution of picric acid as a test for albuminous urine, with results which may be briefly stated as follows: In normal urine it has never given a precipitate or produced any other change than the slight yellow tinge due to the colour of the solution, the mixture remaining quite transparent. When heat and nitric acid, applied with the usual well-known precautions, have shown the presence of albumen, the picric acid solution has invariably caused coagulation in proportion to the amount of albumen.

Most clinical observers are agreed that one of the most delicate tests for a minute quantity of albumen consists in the addition of nitric acid to the cold urine, when a cloud appears at the junction of the two liquids. In applying this test the urine may be poured upon the acid which has been previously placed in the test tube, or the urine having been poured into the test tube, a few drops of the acid are allowed to flow down the side of the tube while held in a sloping position. It sometimes happens that when the amount of albumen is very small an interval of some minutes elapses before any change occurs at the junction of the two liquids. Now, in such cases I have found that a mixture of equal volumes of the urine and the picric acid solution has immediately become turbid with coagulated albumen. In this speedy and decided action of the test upon urine which is only slightly impregnated with albumen, the picric acid solution is superior to nitric acid. In applying this test it should be borne in mind that the picric acid saturated solution is but little heavier than distilled water, its specific gravity being about 1003; so that, unlike the heavy nitric acid, it tends when slowly poured into the tube to float on the surface of the urine, where a film of coagulated albumen forms at the junction of the two liquids. This floating film with the picric acid solution forms a pretty contrast with the film near the bottom of the test tube when nitric acid is the reagent employed. The coagulum formed with the picric acid solution in cold urine requires a very large excess of water for its solution; in fact it is about as insoluble as the coagulum produced by nitric acid. The picric acid coagulum is readily soluble in caustic potash and ammonia; if, therefore, albuminous urine be alkaline it will require to be neutralised or acidulated before applying the picric acid test; but in all my numerous testings with the picric acid I have not once found it necessary to acidulate the urine. One result, then, of my industrious son's purely scientific work at these compounds of albumen has been to supply us with a really valuable addition to our tests for albumen in the urine.

Then it has lately occurred to me, what is obvious enough when once attention is directed to it, that for a saturated solution of picric acid the crystals or the powder may sometimes be substituted with advantage. A small crystal added to the albuminous urine quickly dissolves and as quickly coagulates the albumen. The crystals are permanent in the air, and may be kept for any length of time without undergoing change; and I venture to predict that a few of these crystals in a small bottle will speedily take the place of nitric acid, whether in sealed tubes or in bottles, in all urinary test cases which are made for carrying in the pocket. With picric acid powder or crystals in one bottle, and Cooper and Fehling's test pellets in another, the most complete urinary test case need contain no other liquid than the spirit in a small tubular spirit lamp. I have for some years carried in my case nitric acid in a well-stoppered and capped bottle, and then enclosed in a boxwood box; but I now with a sense of relief replace the destructive liquid acid for the entirely harmless solid.

Since the preceding was written I have met with two specimens of urine suspected to be albuminous, in which picric acid caused a decided opalescence, while nitric acid only darkened the colour of the urine. I am therefore confident that in some cases picric acid will prove to be a more delicate test for a mere trace of albumen than nitric acid. In the solid form the powdered picric acid has this advantage over the crystals, that it dissolves more rapidly.

Savile-row, W.

DR. SEDGWICK SAUNDERS, the Medical Officer of Health for the City, in his report last week, stated that of 302 houses, thirteen required sanitary improvement.

DR. J. C. NUNAN has been elected chairman of the Kinsale Town Commissioners.

## RUPTURE OF THE URINARY BLADDER

By WALTER RIVINGTON, F.R.C.S. ENG.,  
SURGEON TO THE LONDON HOSPITAL.

### PART III.

#### REPORTED CASES OF RECOVERY AND TREATMENT.

THE reported cases of recovery after rupture of the urinary bladder with which I am acquainted are twenty-six in number, and may be arranged as follows:—

1. Partial or subperitoneal ruptures. One case under Mr. Keal.

2. Extra-peritoneal ruptures. (a) Rupture into the vagina. Three cases under Wilkinson, Earle,<sup>1</sup> and a friend of Dr. Blundell's<sup>2</sup> respectively. (b) Rupture into the rectum. Two cases under Ward<sup>3</sup> and Call<sup>4</sup> respectively. (c) Perforations by splinters of bone. Four cases under Astier, Eve, Townsend, and Thompson respectively, to be found in Dr. Max Bartels' paper. (d) Ruptures into the perivesical connective tissue. Eight cases under Syme,<sup>5</sup> Porter,<sup>6</sup> Walker,<sup>7</sup> Padley,<sup>8</sup> Rose,<sup>9</sup> Max Bartels,<sup>10</sup> Berner,<sup>11</sup> and Jeanmaire<sup>12</sup> respectively; and to these I might add a case which came under my own observation.

3. Intra-peritoneal ruptures. Eight cases reported respectively by Walter,<sup>13</sup> Le Gros Clark,<sup>14</sup> Erskine Mason,<sup>15</sup> Thorp,<sup>16</sup> McDougall<sup>17</sup> (two cases), Morris,<sup>18</sup> and Chaldecott.<sup>19</sup>

Partial or subperitoneal ruptures may be more common than is generally supposed, and Mr. Keal's case requires no comment.

In the examples of rupture into the vagina, distended and neglected bladders gave way in consequence of the accession of labour and the use of instruments. The rents were in a most favourable situation, and in this class of cases there is nothing to militate against recovery.

Of the rectal cases, one (Ward's) was secondary from sloughing, and the other (Call's) appears to me to have been probably a rupture of the membranous urethra into the rectum. Such communications are sometimes met with in cases of stricture.

The cases of perforation of the bladder by fragments of bone are only included because they appear in Max Bartels' list. Splinters from fractures of the pelvis pierced the bladder. In one case a splinter came from the urethra; in the others the splinters became encrusted with phosphates, and were removed by lithotomy after the lapse of months or years.

Six of the extra-peritoneal ruptures (Syme, Porter, Rose, Max Bartels, Berner, and Jeanmaire) are undoubtedly genuine instances of recovery after traumatic effusion of urine into the perivesical connective tissue, and require no comment. Mr. Padley's case was not traumatic. The patient had a tight stricture, and urine appears to have escaped from the bladder in consequence of a syphilitic ulcer perforating the wall of the viscus. Of the genuineness of Dr. Walker's case I am far from convinced, and the second-hand report of the case to which I have alone had access is so brief that I reserve a final judgment. A man, twenty-three years of age, had been crushed between an engine and a car. His bladder is said to have been distended. A tumour appeared anteriorly, which subsided when the catheter was used. A rupture of the anterior wall of the bladder was diagnosed, and lateral cystotomy was performed with subsidence of the freshly accumulated tumour, and tenderness. Improvement and rapid convalescence followed, and in fifty-five days the patient resumed his occupation. In the absence of clear

<sup>1</sup> THE LANCET, June 27th, 1829.

<sup>2</sup> Lectures, THE LANCET, Feb. 28th, 1829, p. 677.

<sup>3</sup> New York Lancet, vol. i., 1842. <sup>4</sup> THE LANCET, Dec. 10th, 1881.

<sup>5</sup> Contributions to the Pathology and Practice of Surgery, p. 332.

<sup>6</sup> Rynd on Strictures, p. 48.

<sup>7</sup> Med. Com. Massachusetts Med. Soc., art. iv., case 6, vol. viii., 1845, quoted in Erskine Mason's paper. The original is not accessible.

<sup>8</sup> THE LANCET, March 4th, 1882.

<sup>9</sup>, <sup>10</sup>, <sup>11</sup>, <sup>12</sup> See Max Bartels' paper, op. cit.

<sup>13</sup> Ranking's Abstract, 1862, vol. ii.; and Philadelphia Medical and Surgical Reporter. I have only been able to refer to Ranking's Abstract.

<sup>14</sup> Op. cit. <sup>15</sup> New York Medical Journal, 1872.

<sup>16</sup> Dublin Quarterly Journal, vol. xli., p. 306.

<sup>17</sup> Edinburgh Medical Journal, Jan. 1877.

<sup>18</sup> Medical Times and Gazette, Nov. 1879.

<sup>19</sup> Provincial Medical and Surgical Journal, 1846.