OBSERVATIONS
ON THE
CONSTITUTION OF THE URINE.

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It is generally admitted, that our knowledge of the pathological conditions of the urine, or the relation which the changes in its physical and chemical properties bear to the morbid changes in the constitution, is not as considerable as might have been anticipated from the numerous experiments that have been performed upon it. This depends, I conceive, upon two circumstances; first, upon the nature of the fluid, as being the general excretion, by which all the extraneous substances are discharged from the system, which have been, from any cause, formed internally, or have been introduced *ab extra*; and secondly, from the great variety of causes, both external and internal, which affect the state of the urine, through the intervention of the vital actions of the system.

It has appeared to me, that these difficulties might, at least, to a certain extent, be obviated, by instituting a series of what may be styled statical experi-

ments, where the attention should be exclusively directed to a few well defined objects, the experiments to be all made precisely in the same mode, and consequently, admitting of direct comparison with each other. When a sufficient number of experiments shall have been performed on this plan, I would arrange them in tables, so that each particular point may be at once brought into view in the different cases under examination, and referred to the circumstances under which they were performed.

In the prosecution of this plan, the first step was to fix upon some term of comparison, to which the experiments might be referred, and, for this purpose, an individual of sound constitution and regular habits of life was employed as the standard. What may be regarded as the average healthy state of the urine of this individual was first ascertained, and afterwards the nature and amount of the occasional deviations, with the causes to which these deviations appeared to be referable. When this first object has been fully ascertained, we may compare this standard case with other individuals, noting accurately the differences of constitution, habits, &c., and connect these with the varieties in the fluid. Having accomplished these two points, we shall be prepared for examining the urine in the different states of disease; in all cases employing the same processes, and referring the results to the same standard.

It is obvious, that in order to arrive at any very important conclusions, it will be necessary that the experiments should be very numerous and varied,

and will almost necessarily require the cooperation of many individuals. On this account, I have endeavoured to render them as simple as possible, so that any one, who is disposed to prosecute the inquiry, can have no difficulty in performing the necessary operations. I have also adopted a distinct and well defined nomenclature, and I have been careful always to employ the terms in precisely the same mode. I consider the investigation as at present in its commencement only, but I have taken the liberty of laying my plan before this Society, in order that I might benefit by the remarks which may be made upon it, and still more, that I might engage the cooperation of any of its members who may be disposed to think favourably of it.

The circumstances which have been selected for experiments are the following; external characters, including colour, odour, clearness, specific gravity, &c.; degree of acidity referred to a fixed standard; presence and amount of albumen; amount of residuum after evaporation; proportion of residuum soluble in alcohol; amount of saline contents; amount of calcareous salts; and spontaneous changes.

As a specimen of the tabular form, in which I propose to arrange my results, I have subjoined a synopsis of some experiments that have been performed on the urine that was selected as the standard, to which, in the first instance, the others are to be referred.

1. Designation : time ; quantity.	State of health ; night ; 3x.	Lumbago ; urgent calls ; night ; 3x.	Symptoms of gout ; pain of feet ; night ; 3iv.	Gout gone ; an in- terval of 2 days ; night ; 3xij.	Lumbago ; severe exercise ; profuse perspiration, 2 p.m. 3iv ; urgent call.	Gouty symptoms, rather severe ; exercise ; more urine than ordinary ; night ; 3xiv.
2. External charac- ters ; clearness ; co- lour ; odour.	Bright, clear, citron, urinous	Transparent, light colour ; faint odour.	Slightly opaque ; yellow ; odour na- tural.	Rather brown ; strong odour ; bright and clear.	Clear, bright, light coloured.	Muddy, deep colour, inelin- ing to brown ; odour strong and unpleasant.
3. Specific gravity.	1014	10114	10066	1015	1007	1018
4. Degree of acidity.	6°	4°	4°	4°, after 8 days 12°	3°	6° ; after 9 days 9°
5. Amount of solid contents per cent.	5.05	4.46	2.12	6.3	2.35	5.65
6. Proportion of solid contents soluble in alcohol.	2.6 of 5.05	2.6 of 4.46		4.86 of 6.3	1.1 of 2.35	4.5 of 5.65
7. Effect of heat.	None.	Moderate precipi- tate.	None.	None, or rather brighter.	None.	None.
8. Effect of corrosive sublimiate.	Opacity : when heated, dense flakes ; 2.1 gr. per 3.	Precipitate : when heated, light flakes ; 1.8 gr. per 3.	Precipitate ; when heated, dense flakes ; 1.35 gr. per 3.	When heated, con- siderable brown precipitate ; 3.1 gr. per 3.	When heated, light flakes ; .8 gr. per 3.	Perfectly opaque ; when boiled, considerable pre- cipitate ; 1.8 gr. per 3.
9. Amount of precipi- tate by ammonia.	.5 gr. per 3.	.8 gr. per 3.	.2 gr. per 3.	1.9 gr. per 3.	.2 gr. per 3.	.8 gr. per 3.
10. Amount of pre- cipitate by oxal. ammon.	.3 gr. per 3.	.35 gr. per 3.	.05 gr. per 3.	.45 gr. per 3.	.05 gr. per 3.	.3 gr. per 3.
11. Spontaneous changes.	In 2 days a light cloud ; in 6 days less acid ; some- what opaque and turbid.	Gradually became opaque, and depo- sited a white crust ; less acid in 6 days.	In 2 days consid- erably opaque ; in 4 days considerable deposit ; became alkaline.	In 2 days quite opaque, considerable deposit of light brown sediment, became much more acid.	In 4 days slightly opaque ; white sedi- ment ; less acid.	In 4 days a considerable quantity of pink and white sediment subsided, amount- ing to 1.5 ; the fluid, when filtered, bright and clear.