scribed, and since then have made more than seventy successful operations for perineal sundering, including the pre-anal, perineal, and perineo-anal lacerations, as well as six for partial and (Fig. 10) complete procidentia. The two last cases for complete procidentia were made in the amphitheatre of the New York University Medical College, and the patients then removed to their homes in an ambulance. Both cases were most satisfactory; one in a woman aged 63, who had suffered from complete uterine extrusion for nearly twenty years, the other in a woman aged 71, who had carried her womb in a sling between her thighs for thirty-four years. It is now quite four years since the last was operated upon, and more than forty months since the former. Both women are well.

EXPERIMENTS ON THE INFLUENCE OF DRUGS ON THE EXCRETION OF UREA AND URIC ACID.

By EDMUND ALLEYNE COOK, L.R.C.P. Ed., L.R.C.S. Ed., ETC.

Influence of a Close Atmosphere on the Excretion of Uric Acid.—Some variations in the amount of uric acid excreted having been noticed, while particular attention was directed to evenness of habit and diet, etc., and without the administration of any drug, it was thought probable that a close confined atmosphere had an effect on this excretion. The following estimations bear on this subject.

Date.	Urine.	Sp. Gr.	Urea.	Uric Acid.
November 7 ...	45 oz. acid clear pale	1020 ...	432 grains	10 grains
" 8 ...	45 " " " "	1020 ...	430 "	7 "
" 9 ...	41 " " " "	1023 ...	439 "	22.5 "
" 10 ...	51 " " " amber	1020 ...	480 "	24.3 "
" 11 ...	36 " " " "	1022 ...	423 "	11.9 "

During this period, no drugs were administered, and every effort was made to keep the diet and exercise exact. The low estimation of November 8th in uric acid was obtained from two exactly corresponding experiments, and is the lowest amount obtained in any twenty-four hours during which observations have been made. On the evening of the 8th, two hours were spent in a close room lighted by gas, in company with twelve grown people. The meeting was a committee meeting; there was no excitement; and, although there was much speaking, very little was done by the observer. A restless night followed, and a headache which continued next day. The urine collected on the 9th showed an enormous increase in uric acid, and but little in urea. The headache continued until the evening of the 9th, a most sleepless night following; and, during the 9th, 4 ounces extra water and 6 ounces extra tea were taken. The urine collection of the 10th showed an increase of urea, and an even larger excess of uric acid; the weather was clear and bright throughout, and the usual exercise was persisted in. The above results are given as an extreme instance of the effect of a close atmosphere; and this length of exposure under the conditions mentioned was never tried again.

When the conclusion was once rendered probable that the close atmosphere must have been the cause of the variation of uric acid, and that the headache and discomfort, if not a result of the presence of excess of uric acid in the system, were coincident with it, the fact was always noticed that a close atmosphere for even a comparatively short period was sufficient to increase the amount of uric acid in the next day's urine collection, although no headache might result, and that such an exposure to close atmosphere was sufficient to disturb any experiment which was in progress.

Although such an atmosphere as that breathed during the two hours indicated must have contained a large deficiency of oxygen, it would be far too much to conclude that that deficiency of oxygen was the cause of the excess of uric acid in the urine. The fresh air would contain oxygen, nitrogen, aqueous vapour, and a trace of carbonic acid; while the breathed and vitiated atmosphere would contain less oxygen, nitrogen, more aqueous vapour, large quantities of carbonic acid, and organic material from the various lungs in action; and the last item may act as an absolute poison. Moreover, an animal can breathe in an atmosphere containing many times the amount of carbonic acid normally present in fresh air; but, in such an atmosphere, the blood is freed in a less and less degree of the carbonic acid produced as respiration continues; and it may be not so much the deficiency of oxygen, as the presence of this excess of carbonic acid in the blood, which causes an increased excretion of uric acid, perhaps in consequence of the carbonic acid combining with the alkali with which such uric acid would otherwise combine, *i.e.*, by diminishing the solvent power of the blood for uric acid. The excess of urea in the urine collection of the 10th can hardly be accounted for on the plea of increased disintegration of tissue.

The Influence of Extract of Meat on the Excretion of Uric Acid and Urea.—The following is a summary of the experiments.

Date.	Urine.	Sp. Gr.	Urea.	Uric Acid.
December 4 ...	54 oz. clear acid pale	1022 ...	400 grs.	14.5 grs.
" 5 ...	41 " " " " amber	1023 ...	472 "	12.7 "
" 6 ...	40 " " " " dark	1022 ...	534 "	28.0 "
" 7 ...	34 " " " " "	1024 ...	455 "	18.4 "
" 8 ...	45 " " " " pale	1020 ...	432 "	14.0 "
" 9 ...	31 " " " " amber	1026 ...	...	14.6 "

The diet on December 4th was normal in every way, the urine collection of that morning having been 54 ounces, and having contained 14.5 grains of uric acid. On the 5th, the urine collection was 41 ounces, and contained 472 grains of urea, and 12.7 of uric acid. On this date, with a normal diet, exercise, etc., a solution of Liebig's extract of meat was taken after the meal at 2 P.M. It was made by dissolving half an ounce of the extract in 12 ounces of water, and flavouring with salt. This solution was taken in place of, and not in addition to, the usual water, so that the total fluids consumed remained at 45 ounces; in the evening, a more than ordinary feeling of thirst was experienced. The urine collection of the 6th amounted to 40 ounces, and was dark but clear; gave 543 grains of urea and 28 grains of uric acid. On the morning of the 6th, there was an awaking very severe headache, similar in every way to that occasioned by the two hours of close atmosphere, and chronicled in preceding experiments; this headache persisted all day. Only 6 ounces of urine were passed between 8 A.M. and 5 P.M. on the 6th; but, after taking tea at the latter hour, a free flow of urine took place, and the headache diminished. The urine passed after the tea was taken had a specific gravity of 1030 when cold; the usual gravity of the urine passed at that time being 1008. The specific gravity of the 6 ounces passed during the day was 1028; that of the night was not taken, but the total collection of the 7th was 1024 sp. gr. The headache continued until the morning of the 7th, and was too intense to lightly provoke again; and therefore this experiment was not repeated. The urine collection of the following day was 45 ounces, yielding 432 grains of urea and 14 grains of uric acid.

It has been noted by Dr. F. Womack that creatin may be oxidised by purely chemical processes to uric acid. I do not know the details of the experiments, nor have I seen them in print, but I believe them to be correct in result; and as extract of meat contains creatin as well as other nitrogenous compounds, it may well be that an oxydation process takes place in the animal economy when this article of diet is administered, and thus the increase of uric acid obtained in the above experiment is accounted for. The dose taken was a fairly large one, but cannot be said to have been too concentrated. Had an increased amount of liquid been taken, the resulting headache and discomfort might possibly have been less, but in that case the result would not have been so fixed, and it certainly points strongly to the avoidance of continual administration of beef-tea or solution of extract of meat as an invalid diet. Dr. R. Neale, in a short article in the *Practitioner*, November 1881, draws attention to the fact that Masterman showed how analogous to urine is the composition of beef-tea, etc., and insists with emphasis upon the amount of harm which may be done with these fluids under the supposition that they can strengthen, the weakened frame. The above experiments strengthen this record; for, if half an ounce of Liebig's extract of meat administered in twenty-four hours can so increase the uric acid, what effect must it have upon the state of gouty or rheumatic individuals?

Spirit of Nitrous Ether on the Excretion of Urea and Uric Acid.—The influence of spirit of nitrous ether on the excretion of urine is generally supposed to be so well known that no experiments with it might be deemed necessary. Its action is said to be diuretic or diaphoretic, and the one action is supposed to be the complement of the other. Dr. F. B. Nunneley, however, in some experiments published in the *Practitioner* for 1870, vol. v, page 372, found that it only slightly increases the flow of water and decreases the solids. The circumstance which more immediately prompted personal experiments with this substance was the consideration of some experiments on its action on ordinary urea and sulphur ureas published in the *Deutsch. Chem. Ges. Berz.*, 1871, by A. Claus, and the known fact that a solution of nitrous acid will decompose urea into nitrogen and water. And it was thought that, if the diuretic action of nitrous ether were well established as a constant effect, and if its administration were followed by a decrease of urea and uric acid, then it might receive application as a remedy for gout.

Further, nitrite of amyl and other nitrites are known deoxydisers of the blood, or, more exactly, tend to combine with the hemoglobin and prevent its normal action as a carrier of oxygen; and, reasoning from analogy, nitrite of ethyl ought to have a similar action, and

experiments with it might strengthen or weaken the theory that uric acid is a product of deficient oxydation.

Date.	Urine.	Sp. gr.	Urea.	Uric Acid.
October 25th	38 oz. clear acid amber	1023	482	11.5
" 26th	41 " " " "	1018	447	11.0
" 27th	42 " " " "	1018	443	10.8
" 28th	30 " " " "	1029	424	12.6
" 29th	49 " " " "	1013	426	10.6
" 30th	24 " " " dark	1030	340	15.0
" 31st	30 " " " "	1021	330	lost.
Novemb. 1st	34 " " " amber	1028	345	16.6
" 2nd	30 " " " "	1030	392	13.3
" 3rd	30 " " " "	1030	447	9.6

On October 27th, after three days during which the urine was fairly normal, and no drug had been administered, at 2 P.M., just before a meal, a drachm of strong nitrous ether was taken in four ounces of water. This solution of nitrous ether was equal to three drachms of spirit of nitrous ether, B.P. At 4 P.M. a headache commenced, which was not relieved till 8 P.M. The usual amount of liquid was taken, and no extra exercise or perspiration was present to account for any diminution of urine; yet the urine, passed up to 8 A.M. on the 28th amounted to 30 ounces only, the urea being 424 grains and the uric acid 12.6 grains. On the following day, 80 minims of the same sample of nitrous ether, equal to half an ounce of spiritus etheris nitrosi B. P., was taken in divided doses, the diet and exercise as usual. The bowels were confined. The urine equalled 49 ounces, and the urea was 426 grains, the uric acid 10.6 grains. The following day, the like dose was repeated in the same way, and the urine passed equalled 24 ounces, specific gravity 1030, urea being 340 grains, uric acid 15 grains. The next day no drug was taken, and the urine was 30 ounces, of 1021 gravity, the urea being 327 grains; the uric acid was not estimated, in consequence of an accident. Again, on the 31st, with no drug or abnormality of diet or habit, the urine collection of November 1st was 34 ounces, gravity 1028, the urea 338 grains, uric acid 16.6. Bowels regular. On November 1st, again no variation; and the urine collection of the 2nd gave 30 ounces, 1030 gravity, urea 387 grains, uric acid 13.3; and that of the 3rd, 30 ounces, 1030 gravity, 447 grains urea, and 9.6 uric acid. The average of the urine of the three days on which the drug was administered shows a deficiency of urine, a decrease of urea, and an excess of uric acid to some extent, which seemed to have no cause except the medicine ingested. The amount of urine voided for the next three days, and its content of urea and uric acid, seemed to indicate some influence of the medicine continuing beyond the period of ingestion, and lasting three days. The weather was bright and frosty throughout.

Experiments with this drug were discontinued until December 10th, when the urine equalled 41 ounces, and on the 11th 31 ounces.

Date	Urine	Sp. gr.	Urea	Uric acid
December 12 ...	32 oz. clear amber	1024	409 grains	14.8 grains
" 13 ...	41 " " " pale	1019	416	19 "
" 14 ...	38 " " " "	1020	447	17 "
" 15 ...	38 " " " "	1025	406	17.6 "
" 16 ...	45 " " " "	1020	377	15.7 "
" 17 ...	45 " " " "	1023	480	15.7 "
" 18 ...	30 " " " dark	1025	431	11.6 "

On December 11th, after a period of non-medication, and during which the diet was maintained, 90 minims of the same sample of nitrous ether were taken in 3 doses. In the evening a slight headache occurred, and in the morning following an increased headache. The urine collected on December 12th amounted to 32 ounces, amber, 1024 gravity, and the urea amounted to 409 grains, the uric acid being 14.8; the liquid taken equalled 49 ounces. The weather cold and wet. On the 12th, the 90 minims of nitrous ether were repeated in the same manner; weather continuing cold and wet. There was a feeling of heat, and restlessness, and headache; but no increase of temperature; no change of water or diet was made, except onions as a vegetable at the midday meal. The collection of the boiled 13th gave 41 ounces, 1019 gravity, which yielded 416 grains urea, and uric acid 19 grains. On the 13th the doses of nitrous ether were again administered, as also on the 14th, and the amount and content of the urine collection are given in the table.

All along the nitrous ether produced a feeling of depression, and the weather had been continuously dull and depressing; the pulse was practically not affected, but in no case was there an immediate flow of urine after taking the dose; the calls to micturate were more frequent, probably owing to irritation. The 14th was the last day of the administration of nitrous ether. It had all been taken in the concentrated form, diluted with water, to avoid the administration of the spirit contained in ordinary spirit of nitrous ether, which might have confused the results, already complicated enough. It was thought advisable to cease the administration, because the

period seemed long enough, and some slight irritability of the bladder began to be felt. The results on this occasion differ greatly from those of the former, and there seemed nothing reasonably to account for any difference except the markedly different weather. When the administration ceased, the urine excreted rose to 45 ounces on the 16th and 17th, and the uric acid diminished; and on the 18th was near normal.

These two sets of experiments are evidently wanting in correspondence, and a further set is desirable. There are various points of difference not explicable, and the only points left out of doubt are (1) that nitrous ether is in no sense a diuretic by itself, nor a diaphoretic, and in this the results agree with those of Dr. Nunneley; (2) that it has a tendency to increase the amount of uric acid eliminated. If a solution of nitrous acid in water be mixed with a solution of urea at a medium temperature, a decomposition will occur, and urea and nitrous acid will be converted into water and nitrogen. Such a decomposition may go on in the body to some extent, and thus less urea may appear in the excretions; and certainly this would account for the fact that nitrous acid or nitrites have never been found in urine, although nitrates have been frequently detected after their administration.

THE PICRIC ACID TEST FOR ALBUMEN.

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In the present communication, I propose to refer to some practical points regarding the use of picric acid as a test for albumen, to which my attention has recently been directed. Within the last week, I have been applied to by two practitioners, graduates of the University of London, for an explanation of the following difficulty, which each had met with. A specimen of urine was shown to contain albumen by heat and nitric acid; in one, the albumen was very abundant. But when picric acid solution was gently poured on the surface of the urine, in one case there was no indication of albumen, while, in the other, which contained much albumen, there was a coagulum, which was redissolved. Now, both these gentlemen have misunderstood, and therefore misapplied, my directions for detecting a very minute quantity of albumen (see BRITISH MEDICAL JOURNAL, March 9th).

It should always be borne in mind that, in testing for albumen, the picric acid must be in excess. A few drops of a saturated solution of picric acid in a highly albuminous specimen will form a coagulum, which is quickly redissolved; and this explains the fact that one of my correspondents, who poured the picric acid solution on the surface of highly albuminous urine, got an indication of albumen, which soon disappeared. When urine contains much albumen, it should be mixed with its own volume of the picric acid solution; and in testing a fresh specimen, it is better to begin by adding an equal volume of the test liquid.

One difference between picric acid and nitric acid as tests for albumen is, that whereas an excess of nitric acid, especially when the urine is heated, will entirely redissolve the previously precipitated albumen, no excess of picric acid will redissolve the precipitate which it has once formed in an albuminous solution. Picric acid solution on the surface of the urine is applicable only for the detection of a minute trace of albumen. For this purpose, in my paper read at the Clinical Society, I advise that a column of urine four inches in height should be poured into a six-inch test-tube, and upon this one inch of the picric acid solution. The result is that the upper layer of the urine is mixed with about its own volume of the test liquid; and if albumen is present, the stained portion of the urine is instantly rendered more or less opalescent, and thus contrasts with the unstained and transparent urine below. If the picric acid solution were allowed to flow so gently on to the surface of the urine as merely to come in contact and not to become mixed with its upper portion, the albumen, if present, would not be detected, or it would be indicated only after an interval of some minutes, when the two liquids had become mixed by slow diffusion. There must be an actual mixture in about equal proportions, and not merely contact of the two liquids, to ensure the action of the test.

The slight opalescence caused by the picric acid solution in a sample of urine which contains a mere trace of albumen is always increased by the application of heat. So that, if the flame of a spirit-lamp be applied to the upper part of the opalescent column, this will become more opaque than the lower part, which had not been exposed to heat. I now invariably apply heat to a specimen of