CASE II.—On May 18th of last year, I was consulted by a lady of about seventy years. She came panting into my room, with livid lips, dilated nostrils, and a bumping heart. There was evidence of an obstruction of the liver, with some stomach-derangement, and scanty urine, containing urates, but non-albuminous. There had been for a month oedema of the right leg. There was mitral disease (said to be hereditary), rapid cardiac action, pulse 90, palpitation, intermission, and a short dry cough. Undoubtedly the heart was primarily at fault; but its condition was aggravated by the obstructed state of the hepatic system, the consequence of its own incompetency. By the third day, these obstacles were removed; the colour and odour of the evacuations became natural; and the urine increased in quantity under small doses of mercury.

Attention was now entirely given to the heart, and tincture of spigelia (Savory and Moore's) was administered. This is a powerful remedy in suitable cases; to this I can testify. (See Phillips; also Sharpe in *Practitioner*, May 1878, p. 331.) It was given because of its special action on the heart. The kidneys, acting well, did not require the subordinate action of digitalis. Likewise, the rapid irritable state of the cardiac muscle seemed to imply nervous excitement; therefore the exclusion of digitalis. However, spigelia failed to relieve, in five-drop doses thrice daily, the cardiac oppression and its concomitants. Why did it fail? Therapeutically, it was a wrong remedy. The small dose kept up the force and frequency of the heart's action. It probably acted as a stimulant to the accelerator nerves, and tended to increase the venous congestion. If I had given large doses, I might have considerably lowered the pulse; but then spigelia at the same time physiologically produces palpitation, with strong beating.

On the 25th, the cardiac agitation, dyspnoea, and hot dry skin pointed, with no uncertain indication, to aconite. One minim of Fleming's tincture was given in half an ounce of simple water thrice a day. Its efficiency was quickly apparent. In the course of a week, there was amelioration of all the symptoms; and, when I saw the old lady on July 4th, she was well and jocose.

"The method by which the aconite influences the heart is not certainly settled" (Wood). Therapeutically, in small doses, its beneficial influence is exercised through the cardiac ganglia. The hot dry skin was an important indication of treatment. Aconite, being known to dilate the arterioles, and to "increase the capacity of the vascular system" (Ringer), promotes perspiration and relieves congestion. Thus we obtain, in addition to the direct action on the cardiac ganglia, a powerful drain to the surface.

In weighing the probabilities between veratrum and aconite in a case of cardiac disease, we should deliberately consider the totality of symptoms present in the particular case. In the former case, veratrum was chosen, because of its direct effect on the heart *only*. The kidneys were acting normally; the skin also was normal; and temperature was normal; therefore, to have given aconite in such a case would have been a needless waste of aconite influence, and might possibly have produced a feeling of increased lassitude. In the latter case, veratrum would not have touched either the kidneys or the skin. As aconite embraced these within its beneficial range, it was emphatically *the* remedy, and did not require the clumsy expedient of combining with it spirits of nitre, or potash acetate, to effect that which it was quite capable of doing alone.

The advantage of the single medicine is its simplicity, and its accuracy in operating *only* upon the diseased organ in proper therapeutic dose, which must be far removed from the physiological one.

If a medicine have a special action upon a special organ or part in health, so it would seem very desirable and judicious to administer that particular remedy in disease of that same part which appropriates the remedy in health. But we must bear in mind, as a clinical fact, that the tissues in disease are much more sensitive and responsive to the action of a drug, so that the dose to be then therapeutic must be small.

ANDOVER.—Mr. Farr has little to report for the past year. He states that of the total deaths (144) 64 occurred amongst persons over 60 years, and children under five years of age—a result which is attributed to the unusually severe weather which prevailed in the early part of the year. Of the zymotic causes, scarlatina was the most fatal, causing seven deaths, typhoid fever being credited with three, diarrhoea with two, and measles with two. Diseases of the chest were fatal to 13 persons, and heart disease to eleven, phthisis causing two deaths only. Alluding to the prevalence of typhoid fever Mr. Farr states, an inspection of the surroundings of the 43 cases which happened showed that they were due, directly or indirectly, to imperfect drainage. In this connection it is satisfactory to note that the Town Council have before them a scheme for the construction of a complete system for the disposal of sewage, and in other ways seem alive to the importance of their duties.

A NEW PROCESS FOR THE ESTIMATION OF URIC ACID.

By EDMUND ALLEYNE COOK, F.C.S., L.R.C.P. & S.Ed., etc.

THE published methods for the estimation of uric acid are numerous; but, from the now classical mode of adding hydrochloric acid and crystallising, to the last of Pavy, they are either unpractical or otherwise unsatisfactory in their application to the estimation of the uric acid in urine; nevertheless, the number of efforts made in this direction are sufficient proof of the desirability of a good process.

The process of precipitation by hydrochloric acid is unsatisfactory, on account of the whole of the acid not being thrown down, even after prolonged standing, and the proportion left in the solution, if urine be the substance operated on, is very different from that which remains after the decomposition of a simple urate solution, and varies with the varying constituents and the gravity of the original liquid. In 1871, Salkowski proposed to precipitate the urine by hydrochloric acid, and then, after removing the precipitate, to render the solution ammoniacal and filter, and then precipitate by a solution of nitrate of silver; but this process never found favour: for, although to a certain extent more accurate, it was much more troublesome.

From a table of twenty-eight experiments, the following are extracted.

No. of Experiment.	Urine in c. c.	Specific Gravity.	Uric Acid in 200 cubic centimetres.			Uric Acid Absolute Amount.
			By HCl.	By Ag Nos.	Total.	
15	1040	1019	0.0275	.. 0.031	... 0.0585	0.304
16	880*	1018	0.087	.. 0.026	... 0.113	0.477
17	1230	1018	0.033	.. 0.070	... 0.103	0.633
19	1500	1014	0.0 (?)	.. 0.031	... 0.031	0.232
23	—	1018	0.037	.. 0.044	... 0.081	—
26	900*	1017	0.0085 (?)	.. 0.059	... 0.0675	—

This process was commented upon by various observers, and it will be seen that, if it is to be considered accurate, we must modify greatly our ideas of the quantity of uric acid passed by an adult, as the results given are manifestly low.

Later, Bunsen proposed a method by heating the uric acid containing fluid with baryta, in a closed tube, with certain precautions; but the process is not readily executed, and not accurate.

In 1875, Fokker proposed a new method, which he considered not free from error, but still, more accurate than those then existing. It consisted in rendering the urine alkaline, and adding sufficient ammonium chloride to precipitate the uric acid as acid urate of ammonia; this was collected, treated with acid, washed, dried, and weighed. This process is certainly more accurate and practical than any previous, but it still seemed unsatisfactory: for, only a short time back, we find a proposal to revert to the old hydrochloric acid process, with the modification of violent agitation.

Pavy lately proposed a method by which the reducing action of uric acid on an alkaline copper solution was taken advantage of; and he showed that, in normal urine, his process was accurate enough, provided no other substance capable of reducing copper solution was present. I have tried this process, among others, and think it still leaves much to be desired. The colour of the urine is very apt to mask the terminal point of the reaction; and, it appears to me, urine is too varying a fluid to hope to apply any volumetric method to any constituent which exists in it in so small a percentage as does uric acid.

In contemplating some physiological experiments, all these processes, and some others, were passed in review, and found unsuitable; and, therefore, efforts were made to devise a better mode.

The amount of uric acid daily excreted by a healthy adult is variously stated by different authors, and is generally thought to be below ten grains per day, while the amount of urine passed averages fifty ounces. Taking these figures as accurate, it will be seen that the uric acid solution voided is equal to 1 in 2400, which is certainly a very dilute solution. The urates are all slightly soluble in water, and a very insoluble compound would be necessary in order to precipitate a proportion of uric acid so small as exists in ordinary urine.

After many trials, it was found that urate of zinc was probably the most suitable insoluble compound to form a basis for a process to estimate the acid. If to a solution of urate of soda, slightly alkaline, a solution of zinc sulphate be added, a white gelatinous precipitate will be thrown down; and if 100 c. c. of a very dilute solution of zinc sul-

* Not all.

phate be taken, and one or two drops of a solution of urate of soda, containing .648 grm. of uric acid, in 100 c. c., be added, a permanent precipitate of urate of zinc will result; and, although this precipitate is certainly soluble, it is very slightly so in neutral or slightly acid solutions. It is soluble in caustic alkali and in free acid.

If 10 c. c. of the above solution of urate of soda be placed in a urea estimation apparatus, with sodium hypobromite, it will, at 60° Fahr. and 30 in barometer, yield 8.5 c. c. of nitrogen gas. If 10 c. c. of such a solution be added to 90 c. c. of water, and precipitated with a strong solution of zinc sulphate, the precipitate washed with water saturated with zinc urate and then filter and precipitate placed in a urea estimation apparatus, with sufficient sodium hypobromite of full strength, it will yield 8 c. c. nitrogen at the above temperature and pressure.

To apply these facts to the estimation of uric acid in urine, it is sufficient to take 300 or 400 c. c. of the urine and add a few drops of strong solution of caustic soda, enough to render it decidedly alkaline; allow the precipitate of phosphates to subside, and pour off 100 c. c. of the clear solution; add to this clear solution about 4 c. c. of a solution of zinc sulphate, 1 in 3 strength. The solution of zinc sulphate renders blue litmus red, and it must be added to the urine until a drop of the mixture on blue litmus gives a slightly red circle. If the solution be too acid, a drop or two of caustic solution will render it neutral. The precipitate is thrown on a filter, and washed with a saturated solution of zinc urate. This solution is made by adding a little zinc sulphate to distilled water, and then adding urate of soda until a permanent precipitate remains; this is allowed to subside, and the solution is used for washing until all urea and ammonia are removed. The drained precipitate is folded in the filter, and placed, with 50 c. c. of hypobromite of sodium of full strength, in an urea estimation apparatus, and agitated carefully. The gas evolved will be an indication of the amount of uric acid present in 100 c. c. of the urine. The evolution of gas does not commence immediately, and there is sufficient time to insert the stopper and note the number at which the water stands in the gas-tube. If a reaction begin immediately, the precipitate has not been sufficiently washed. The reaction is complete at the end of half an hour, without the application of heat. On many occasions, when the urine precipitate was mixed with the hypobromite, a blue colour appeared, and again disappeared, and at first this was supposed to be due to a substance other than uric acid; but, in repeated experiments with urate of zinc, made from pure white crystals of uric acid, the same blue colour was observed. This blue is not indigo. A quantity of pure urate of soda was precipitated with zinc sulphate, and washed; the precipitate mixed with distilled water, and hypobromite of sodium added drop by drop; the colour appeared, and deepened to a dark blue. Tartaric acid was then added, when the colour disappeared, and would not return when the solution was rendered alkaline; nor on further addition of hypobromite. The zinc precipitate can be dissolved in caustic soda solution, diluted, and used with boiling Fehling's solution, in the manner proposed by Pavy.

Effect of the Presence of Ammoniacal Salts on the Precipitate.—Ten c. c. of the standard solution of urate of soda were added to 90 c. c. of water, and 1 grain of ammonium chloride added. The mixture was then precipitated as usual with zinc sulphate, filtered, washed, and placed in urea apparatus; the gas yielded equalled 8 c. c., indicating that the presence of ammoniacal salts is not detrimental, as the whole of the ammonia can be removed by washing.

Hippurate of zinc is soluble in water, and the other nitrogenous constituents of urine, if precipitated with the uric acid, are in too small amounts to sensibly affect the result.

With a filter pump, the precipitation, and washing, and evolution of gas, may all be completed in one and a half hours; and, of course, several experiments may proceed at one time.

Although this process will not give a mathematically accurate estimation of uric acid, it is one which, with ordinary care, will give very approximate results; and, although it may be urged that the solubility of zinc urate may be greater in urine than in water, yet the results of a number of experiments will always be comparable with each other. It may be possible that, under special circumstances other substances may be precipitated, and may interfere with the estimation, yet, in normal urine, the sources of error are small, and a series of estimations have given very interesting results; moreover, there are many drugs which will not themselves affect the composition of the precipitate, and therefore are no bar to accuracy.

In describing his new process for uric acid estimation, Pavy suggests that, if his results be confirmed, the normal amount excreted by a healthy adult is much higher than has been hitherto supposed. The results obtained by the above-described process confirm this observation; and in a series of experiments, carried on with but slight inter-

mission for three months, the total uric acid excreted by one individual, in apparent health, was never less than 10 grains, and seldom less than 12 grains, per twenty-four hours; while many apparently trivial circumstances increased the amount largely. The results were occasionally confirmed by decomposing the zinc precipitate with dilute sulphuric acid, drying and weighing the resulting crystals. It was found that, when hydrochloric acid was used to dissolve the zinc urate, there was much less tendency for the uric acid to separate. The results of a series of observations, and the effect of the administration of various drugs in a healthy individual, will be given in a future paper in detail; but it may be stated here that any results, based on the estimation of urine voided at any given period of the day, are utterly fallacious; and, further, an estimation, based on the analysis of the urine of any one period of twenty-four hours, is also apt to be misleading.

SOME PRACTICAL POINTS IN THE TREATMENT OF HÆMOPTYSIS.*

By JAMES M. WILLIAMSON, M.D. EDIN., Ventnor.

In bringing forward, in a very brief manner, some practical points in relation to this question, I will, for the convenience of the first part of my object, divide cases of hæmoptysis into three kinds: first, the slight; second, the copious; and third, what may be termed the explosive.

In the *slight* form, the basis of the sputum is composed of mucus which is stained more or less deeply with blood, the bleeding vessel being of small size. The most successful remedy for this form is ergot.

In the second or *copious* variety, the expectoration consists of pure blood, the quantity of which may vary up to a very large amount; and the bleeding ceases gradually until the attack is over. Here again the most successful remedy is ergot, and indeed it is in this kind of hæmoptysis that ergot is especially efficacious. In order to prove efficient in hæmoptysis, however, ergot must be given boldly. One teaspoonful of the liquid extract is a suitable dose, and it may be ordered every half-hour, hour, or two hours, according to the urgency of the case. If it is doing good, it is a mistake to leave it off before the sputa are bloodless, although the intervals between the doses will be lengthened as the hæmorrhage abates. In a few of these cases, ergot will fail; not in many, but now and then. If seven or eight doses be ineffectual, it is best to abandon it. The next remedy worthy of confidence is gallic acid, which it is necessary to give freely, in doses of fifteen to twenty grains, at intervals the same as in the case of ergot. Should there be tedious delay in the final clearing up of small traces of blood from the sputa, an acid mixture with quinine is usually effectual; or, if very obstinate, ipecacuanha, in twenty-minim doses of the wine pushed to slight nausea, will generally remove them.

In the third or *explosive* variety of hæmoptysis, the attacks are profuse, sudden in their onset, all at once ceasing, often for many hours, then abruptly bursting out again. There is no gradual subsidence. The lesion is probably a rupture of some aneurysmal sac in the wall of a cavity. Now it is in these cases that ergot is hardly ever of much use. In my experience, the best remedy is turpentine internally, with cold applications over the chest. Three half-drachm doses of oil of turpentine may be given, half an hour apart; or, it care be taken to follow it with castor-oil, even more than three. When the turpentine is left off, it is well to follow up closely with a mixture of gallic and aromatic sulphuric acids, sulphate of magnesia, and quinine. It is particularly in this type of case that digitalis is often useful for calming vascular excitement. As the patients often make blood very rapidly, the free use of aperients ought to be enjoined.

Nothing would be easier than to quote a long string of remedies for hæmoptysis, but my present object is to leave prominently on the mind one or two that are to be relied upon, and to indicate their spheres of usefulness. Nor is it necessary to dwell on certain instructions which apply to all forms of blood-spitting. Constipation must not go unrelieved, and is best treated by salines. A quick pulse must be steadied by digitalis, of which perhaps the most handy form is the digitaline granule of Homolle and Quevenne. Cough is to be soothed; the simpler the mode of accomplishing this the better, but it must be done; and nothing answers better for this than a chloroform pad laid over the sternum.

Speaking in a general way, and not alluding to hæmoptysis of cardiac origin, I hold that we should keep before our minds the advisability of stopping all blood-spitting in phthisis without delay. To this rule, perhaps, there are two exceptions. The first is trivial. It is

* Introduction to a discussion on the treatment of hæmoptysis, at the January meeting of the Isle of Wight District of the Southern Branch.