

**Observations upon the action of ipecacuanha and its alkaloid emetia / by
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Duckworth, Dyce, Sir, 1840-1928.
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University of Glasgow. Library

Publication/Creation

[London] : [Printed by Spottiswoode and Co.], [cbetween 1800 and 1899?]

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Professor J. Styrke Bennett
from his former pupil the writer
with best regards.

[Reprinted from St. Bartholomew's Hospital Reports, Vol. VII.]

*Observations upon the action of Ipecacuanha and its alkaloid Emetia. Part II.** By DYCE DUCKWORTH, M.D. Edin.

I HAVE made some further experiments to determine whether the toxic effects on the alimentary canal were similar after the employment of emetia by the mouth, and by subcutaneous or venous injection; or, in other words, to ascertain whether the changes produced were due to the local action of the poison on the tissues, or occurred as the effect of remote change of innervation. Ipecacuanha and emetia must be classed amongst irritant emetics.

As with potassio-antimonious tartrate (tartar emetic), so with emetia, vomiting can be induced by either subcutaneous or venous injection of it, without any manifest signs of gastric irritation. Ipecacuanha and its alkaloid are undoubtedly local irritants of mucous membrane, and severe inflammatory changes occur in the alimentary canal when poisonous doses are given either by skin or mouth. The only known exception, I believe, to non-irritant emetics is the lately discovered base apomorphia, which, according to the observations of my colleague Dr. Gee, does not cause any gastric irritation when given by the mouth.† The change induced in the medulla oblongata, or on the gastric filaments of the vagus by the so-called irritant class of emetics may not be, and probably is not, of an irritant nature in the sense in which the term is commonly used; and so emetia, at all events in its earliest action, may, like apomorphia, do no more than upset the equilibrium of the centres of the vagi.

The following experiments were made to contrast the toxic phenomena as produced respectively by subcutaneous injection and exhibition by the mouth; and, together with the results of those observations previously recorded, enable me to describe more definitely the characters of emetia as a poison.

* For Part I. see 'St. Bartholomew's Hospital Reports,' vol. v. p. 230.

† Ibid. vol. v. p. 215.

1. *Subcutaneous Injection.*

Experiment XXII.—Injected gr. ss. (solution of acetate of emetia, gr. iij. ad flʒj.) in two places under the skin of a strong cat. In fifteen minutes, temperature in rectum 104.2° F. In twenty minutes frothy mucus was vomited several times (stomach empty). In eleven hours, temperature in axilla 102° F., in rectum 104.2° F. In fourteen hours, injected gr. j. under skin. Temperature in rectum 103.6° F. Sedative effect. Food and drink refused. Third eyelids partially drooped. In nineteen hours, temperature in rectum 102° F. Occasional cries. In twenty-two hours, purging of fluid matters (mucous diarrhœa). Temperature in rectum 103° F. Matters from bowel examined under microscope, mucous corpuscles and crystals of phosphates found. Death in thirty-three hours. *Sectio* in fifteen hours. Ecchymoses at sites of injection. On opening the thorax, the lungs did not collapse; their colour was almost uniformly pink. Upper lobes and anterior portions emphysematous. Some portions collapsed, and generally there was congestion and œdema posteriorly. Trachea slightly congested, some serum in small bronchi. Heart, dark semiclotting blood in all cavities, most in right ventricle. Liver, congested in hepatic radicles. Gall-bladder full of thin bile. Stomach contracted; layer of sticky mucus on membrane, which was congested in one or two places. Duodenum, well marked congestion from pylorus onwards, almost uniform in amount; jejunum and ileum in same condition, except the last twelve inches of latter, which were pale. Peyer's patches natural. Much opaque, scammony-coloured, mucus especially at lower end of ileum. Cæcum natural; colon congested only in its lower third, with free coating of mucus. Enlargement of ileo-cæcal glands. Spleen contracted, rather void of blood. Bladder empty; excess of mucus on walls. Kidneys, cortex fatty; moderate congestion of pyramids. (This experiment may be compared with XVIII.)

Experiment XXIII.—Healthy guinea-pig. Temperature in rectum 100.6° F. Injected $\frac{3}{4}$ gr. acetate of emetia subcutaneously. Animal at once held itself together, and seemed prostrated. Breathing short and hurried; gradually respirations became reduced in frequency. Death, sudden, in ten minutes. Temperature of peritonæal cavity a few minutes after death 93.4° F., and falling rather rapidly. *Sectio* in two hours. No rigor. Trachea tied. Lungs engorged, especially pos-

teriorly. Darkest portions cut out, did not sink in water. Heart, cavities full, blood dark and partly clotted on right side, dark clots on left side. Liver, hepatic venous congestion. Stomach, slight post-mortem digestion near pylorus. Intestines pink in tint, mucous surface apparently natural throughout. Spleen small, not congested. Kidney, left, moderately congested.

Experiment XXIV.—Healthy guinea-pig. Temperature in the groin 102.3° F. Injected subcutaneously gr. $\frac{1}{4}$ acetate of emetia. Sedative effect soon observed. In two hours more prostrate. Temperature in groin 99.3° F.; in five hours 98° F.; ate some cabbage; in twelve hours temperature 97.5° F.; respirations 60 per minute. Death in about twenty hours. Body lay on belly for twelve hours. Rigor present. *Sectio*. Lungs mottled with congested portions, full of blood generally. No parts sank in water. Trachea void of undue amount of mucus or serum. Heart, all cavities contained dark clotted blood; same in veins. Liver and spleen apparently natural. Stomach distended with gas and some food; mucous surface partly digested, and near pylorus and in greater curvature was congested. Duodenum and much of small intestine contracted, with general vascular injection and excess of mucus, the latter especially in the duodenum. Much mucous fluid and 'débris' of food in parts of ileum. Nothing noteworthy in large intestines. Kidneys natural. Supra-renal bodies congested. Bladder moderately distended. Some clear urine removed by a needle-syringe, highly albuminous, and gave signs of the presence of emetia when treated with tincture of galls.

2. *Exhibition by the Mouth.*

Experiment XXV.—Gave gr. j. acetate of emetia by mouth to young vigorous cat. Vomiting in five minutes, depression. Death within twelve hours after repeated vomiting. *Sectio* in twelve hours. Trachea tied. Lungs pale and emphysematous in upper lobes and anterior margins. Central portions collapsed. Dark coagula in branches of (probably) pulmonary artery. Œdema of roots and lower lobes. Trachea and bronchi slightly congested. Heart, distension of right side with soft dark clots; small and softer dark clots on left side. Stomach, contracted, uniform moderate congestion. At beginning of duodenum, and for about two feet onwards into ileum, vivid crimson injection of mucous membrane, with increase of mucus on its surface (more than in Case XXII). Lower part

of ileum natural, also cæcum and colon; soft faecal matter in latter. Liver natural, slight hepatic venous congestion in parts. Kidneys same as in last case (kidneys of London cats being generally fatty, as shown by Dr. George Johnson * and others). Bladder empty. (This experiment may be compared with XV.)

Experiment XXVI.—Healthy guinea-pig. Temperature in rectum 100.8° F. Gave gr. $\frac{3}{4}$ acetate of emetia with bread-crumbs by mouth. In two hours seemed prostrate, movements languid, temperature in rectum 99.8° F. In six hours, in same condition, refused food. In eleven hours, respirations hurried, short, 64 per minute, very prostrate. Surface chilly, temperature in groin 93° F., in rectum 93° F. Pressure on the abdomen excited squealing. No purging. Death within twenty hours. *Sectio* in two hours. No rigor. Lungs full of blood, mottled with dark congested portions throughout their substance; these being cut out floated on water. Trachea empty, membrane injected. Heart, right cavities moderately distended with dark fluid blood, left side less full of dark blood. Liver, slight hepatic venous congestion. Spleen natural. Kidneys moderately congested. Supra-renal bodies markedly engorged. Intestines, all the coils of the small gut were of vivid pink colour, with fully injected vessels, an excess of fluid, and of mucus generally. Mucous surface congested throughout, and the same was the case in the rectum.

Commentary.—In the first of these cases death occurred after thirty-three hours, as the result of injecting gr. j. ss. of emetia under the skin. It is to be noted that enteric inflammatory changes were more severe and advanced than in the fourth case, where gr. j. of the alkaloid was introduced directly into the alimentary canal. In the latter case, however, there was apparently a more free secretion of mucus in the intestines. On the whole the toxic effects are similar whether the poison be given by the mouth or by the skin, and such grades of difference as were noted in the several experiments appear rather to be due to the length of time the animal survived the fatal dose. This observation was forced upon my attention as to the condition of the intestines in my former experiments; and I can now affirm with more confidence that the degree of enteritis seems to be determined by the time allowed for the emetia to act. Thus in Case XXII., where the animal lived thirty-three hours, there was purging, while

* 'Diseases of the Kidney,' p. 392. 1852.

in Case XXV., where death occurred within twelve hours, the lower portion of the ileum and the large intestines were not affected.

My former observations as to the condition of the lungs have been confirmed by every fatal case I have since witnessed, and I have no doubt as to the abundant presence of blood in the lungs of animals poisoned by emetia.

Experiment XXVII. was purposely made in order to compare the appearances between the lungs of an animal killed by emetia and those of one decapitated. A healthy cat was instantaneously beheaded, and its thorax opened. The lungs were found collapsed and bleached throughout. Their colour was infinitely paler than the most pale emphysematous portions of the lungs of an animal poisoned by emetia. The heart was contracting with moderate force in both ventricles, and the auricles appeared to be acting about twice as rapidly. There was very little blood in any of the cavities.

Emetia has a very decided effect upon the heart. The sudden introduction of large doses produces rapid paralysis of this organ. Experiment XXIII. illustrated this, and further examples of death from this cause will presently be detailed—vide Experiments XXVIII. and XXIX.

Cumulative doses within a short period cause death in this manner, before there is time for the production of many of the characteristic symptoms of more slow emetia poisoning.

In cases where death occurs after the lapse of many hours, the cavities of the heart are generally found full of dark blood or coagula, especially those of the right side, and the veins in connection with the auricle.

The effect upon the temperature is to lower it. In Cases XXIV. and XXV. this was especially noticed. The same result is observed in both woorara and apomorphia poisoning, according to the testimony of Dr. Gee; and I am indebted to the same authority for informing me of some German experiments* which satisfactorily prove that mere starvation, a condition almost always present in emetia-poisoning, has no very appreciable effect in lowering the bodily temperature.

I have again confirmed the occurrence of albuminuria as a symptom of this poison. (Experiments XXIV. and XXVIII.)

* Theodor Jürgensen, *Ueber den typischen Gang des Tageswärmes des gesunden Menschen*. 'Deutsches Archiv für klinische Medicin,' Bd. iii. p. 166, 1867. In thirty-three hours of fasting the mean temperature was 25° — 27° Cent. below temperature of full diet.

OBSERVATIONS UPON THE PHYSIOLOGICAL ACTIONS OF
IPECACUANHA AND EMETIA.1. *Influence upon the Pulse and Arterial Tension.*

I pass on next to record some experiments made to determine the effect of emetia upon the heart and vascular system.* In studying the action of a drug like ipecacuanha, it is obviously of much importance to know whether it exerts any influence upon the blood-pressure. From this enquiry, I expected that I might possibly find some clue to the explanation of the hæmostatic property of this medicine. The experiments were conducted throughout with great care, every source of fallacy being excluded.

Experiment XXVIII.—Young retriever dog. Temperature of laboratory under 60° F. Ludwig's Mercurial Kymograph employed. Canula placed in right carotid artery. Trachea opened and tube inserted. More than gr. ij. of emetia gradually introduced into circulation. Death by cardiac paralysis in an hour and a half.

* I must here record my grateful thanks and obligations to my friend and former fellow-student, Professor William Rutherford, for it is entirely owing to his skill and kind assistance, and the use of his apparatus in the Physiological Laboratory at King's College, that I have been enabled to carry out these enquiries.

Time	Pulse in 10"	Mean Pressure in Millimètres of Hg.	General Notes
			Temperature in Rectum 102½° F. Pulse 120 per min.
h. m. s.			
3 25 P.M.	20	104	
- — 30 .	. .	. .	Coughing.
- 30 .	. .	120	
- 33 .	20	126	
- 36 .	. .	. .	Injection of ½ gr. emetia acetate subcutaneously.
- 38 .	34	124	
- 40 .	24	126	
- 41 .	24	124	
- 41 5 .	. .	. .	Do. do. do.
- 43 .	25	124	
- 45 .	25	120	
- 46 5 .	. .	. .	Do. do. ⅓ gr. do.
- 47 .	27	120	
- 49 .	30	121	No vomiting.
- 53 .	27	122	
- 55 .	. .	116	Temp. in rectum 99·4° F.
- 56 .	28	118	
- 57 .	. .	120	
- 58 .	. .	. .	Injection of ½ gr. subcutaneously.
4 — .	26	120	
- 3 .	29	120	
- 6 .	. .	. .	Do. do. do.
- 8 .	29	120	Temp. in rectum 100·1° F.
- 14 .	. .	. .	Injection of ¼ gr. subcutaneously.
- 15 30 .	26	. .	
- 16 .	. .	. .	Do. do. do.
- 20 .	30	120	
- 23 .	. .	. .	Injection of ¼ gr. into left jugu- lar vein.
- 25 30 .	. .	126	
- 26 15 .	. .	110	
- 28 .	. .	128	Temp. in rectum 100·2° F.
- 32 .	. .	. .	Inject. of ¼ gr. into left jugular vein.
- 33 .	35	. .	
- 35 .	34	120	
- 37 .	. .	108	No vomiting.
- 37 15 .	. .	120	
- 40 .	40	118	
- 40 45 .	. .	110	
- 41 .	. .	. .	Do. do. do.
- 42 45 .	. .	110	
- 43 30 .	. .	104	
- 46 .	37	106	
- 48 .	. .	. .	Do. do. do.
- 50 .	39	102	
- 54 .	. .	. .	Temp. in rectum 97° F.
- 54 30 .	. .	. .	Inject. of ¼ gr. into jugular vein.

Immediately after the last injection, that is, after more than gr. ij. of emetia had been passed into the circulation, paralysis

of the heart occurred, and after an universal quiver the animal died. Small quantities were introduced at first, and as no appreciable effects followed, the injections were made larger, and the last five were introduced by the jugular vein. It is manifest from this experiment that no marked alteration occurred in the blood-pressure; and, as the observations extended over the unusually long period of an hour and a half, a correct estimate may be made of such variations as are recorded. The pulse failed and became slower just at the last, and in order to ascertain whether the slowing of the heart was due to inhibitory action of the vagus, both vagi nerves were divided, but no change took place; hence the failure was not due to this cause.

It is to be noted that no retching or vomiting occurred during the experiment; and I have no explanation to offer as to the absence of this symptom of the poison.

Sectio immediately. Right auricle slightly contracting, and fibrillary movements in right ventricle. Heart generally flabby and relaxed. Lungs looked pale, but on section were found to contain plenty of blood. Motor nerves not paralysed (ascertained by application of induced electrical current). Urine, removed from bladder, albuminous.

In order to check the results obtained by this experiment, another one was made under precisely similar conditions.

Experiment XXIX.—English terrier dog. Trachea opened, and tube inserted. Canula in right carotid artery. Two grains of emetia introduced gradually into circulation. Death by cardiac paralysis in thirty-six minutes from time of first injection into jugular vein. Temperature in rectum 102.3° F.

Time	Pulse in 10''	Mean pressure in Millimètres of Hg.	General Notes
h. m. s.			
2 30 P.M.	. .	. .	Apparatus ready.
- 37 .	. .	. .	Temperature in rectum 101.2° F.
- 38 .	. .	150	Apparatus opened.
- 41 .	23	140	Sobbing respiration.
- 45 .	. .	. .	Blood coagulated in carotid tube.
			Enema of carbonate of sodium given, and tube cleared.
- 51 30 .	. .	. .	Apparatus reopened.
- 52 .	19	150	Slightly sobbing respiration.
- 53 5 .	. .	150	$\frac{1}{8}$ gr. emet. acet. injected into jugular vein.
- 54 .	18	. .	
- 54 5 .	. .	140	

EXPERIMENT XXIX.—*continued.*

Time	Pulse in 10''	Mean pressure in Millimètres of Hg.	General Notes
h. m. s.			
- 56 P.M.	. .	133	$\frac{1}{8}$ gr. emet. acet. injected into jugular vein
- 56 30 .	. .	140	
- 57 .	23	130	
- 57 25 .	. .	135	
- 57 75 .	. .	150	
- 58 5 .	. .	150	
- 59 20 .	20	150	
3 1 .	. .	135	$\frac{1}{4}$ gr. do. do. do.
- 1 45 .	22	. .	Breathing perfectly quiet.
- 2 .	. .	150	
- 2 30 .	19	. .	
- 3 .	. .	140	Breathing sobbing.
- 4 .	. .	130	Do. do.
- 4 30 .	23	150	Do. do.
- 5 5 .	. .	130	Temperature in rectum 100·2° F.
- 6 .	. .	150	Breathing sobbing.
- 7 .	. .	150	$\frac{1}{4}$ gr. emet. acet. injected.
- 7 5 .	. .	135	Breathing sobbing.
- 8 .	23	. .	
- 8 33 .	. .	140	Do. do.
- 9 5 .	. .	150	No vomiting.
- 10 .	20	. .	Breathing still disturbed.
- 11 33 .	. .	140	
- 12 .	. .	140	$\frac{1}{4}$ gr. emet. acet. injected.
- 12 30 .	21	. .	Slight struggling.
- 13 .	22	140	Violent and sobbing respiration.
- 14 .	. .	135	$\frac{1}{4}$ gr. emet. acet. injected.
- 14 30 .	24	. .	Violent resp. Slight struggling.
- 15 .	. .	145	Respiration more tranquil.
- 16 30 .	24	110	
- 18 .	19	. .	
- 18 30 .	. .	120	$\frac{1}{4}$ gr. emet. acet. injected.
- 20 .	. .	. .	Blood coagulated again in carotid tube. Enema of carbonate of sodium repeated, tube cleaned and readjusted.
- 21 .	. .	. .	No vomiting.
- 27 .	. .	. .	Temperature in rectum 100·2° F.
- 27 5 .	18	140	Apparatus reopened.
- 29	{ Pulses very irreg. 17, 13, 19 in succes. 10'' }	135	Respiration intermittent. Occasional struggles.
- 30 .		70	$\frac{1}{2}$ gr. emet. acet. injected.
- 30 5 .	. .	20	Opisthotonos. Death.
			No vomiting occurred.

A study of the above table will show that there was a slowing of the heart's action just before death, and that no percep-

tible effect was produced either upon the pulse or upon the blood-pressure. As in the last experiment, there was the absence of the most usual symptom of the drug, namely vomiting. The emetia employed was part of the same sample I made use of in all my other observations.

Some slight inconvenience was caused by the tendency to rapid coagulation of the blood in the carotid tube, and it seemed that this was partly prevented by the injection of carbonate of sodium solution into the rectum.

As in the last case, death was directly due to syncope when the fatal dose had been accumulated in the circulation. To save time, the emetia was introduced by the left jugular vein, and not subcutaneously.

Sectio immediately. Some movements in auricles. Heart, as in previous case, with only slight distension of its cavities. Blood liquid everywhere. Lungs looked rather pallid on first opening the thorax, but proved to contain abundance of blood when cut into.

Some blood (fl 3ij.) was taken from the left ventricle, and given to a small cat. Repeated vomiting followed, and in the course of twelve hours the animal died. A large cat in the laboratory also lapped some of the blood, and was manifestly rendered poorly by it for some days subsequently.

I believe that the experience gained from the two preceding observations warrants the statement that emetia exerts no important influence upon arterial tension. Neither does it afford any explanation of the hæmostatic action of ipecacuanha. I would, however, offer for consideration the following view as to this latter property. It is certain that the drug especially affects the medulla oblongata. This organ is believed to be the centre of the whole vaso-motor system. It seems not unlikely that amongst other influences of ipecacuanha, an irritant action may directly excite the vaso-motor centre, and so cause increased contraction of the smaller arteries, and possibly of the capillaries; or again, the irritation may perhaps not be direct, but be a reflex one through the vagus.

In either case, the blood-pressure should be increased. It is true that there was no increase of arterial tension manifested in Experiments XXVIII. and XXIX., but it must not be forgotten that there was absence of vomiting on both of these occasions.

2. *The Effect of Section of the Vagi upon Emetia-vomiting.*
(Abortive Experiment.)

The following experiment was made to ascertain whether the emetic action of emetia was in any way affected by division of the vagi nerves. In this instance, however, no vomiting occurred, although a grain and three-quarters was passed into the circulation of the animal. I have thought the notes of the experiment worth recording.

Experiment XXX.—A full-grown cat was placed upon a Czermak's holder, and the vagi were exposed.

Time		Observations
h.	m.	
2	13 P.M.	Vagi exposed. Gr. $\frac{1}{4}$ acet. of emetia injected into left jugular vein.
—	26	No effect. Do. do. do.
—	30	Syncope, extreme irregularity of the heart's action. Ammonia to nostrils, head set free.
—	35	Somewhat revived. Breathing hurried. Temperature in rectum $101\frac{4}{5}^{\circ}$ F.
—	50	Vigorous again.
—	52	Bolus of oatmeal containing gr. $\frac{1}{4}$ of acet. of emetia given by mouth.
3	3	No effect. Do. do. do. do.
—	10	Temperature in rectum $100\cdot4^{\circ}$ F.
—	30	No vomiting. Gr. $\frac{1}{2}$ more given by mouth in bolus.
—	45	No retching or vomiting. Left vagus (undivided) stimulated by interrupted current. No effect.
—	50	Gr. $\frac{1}{4}$ more injected into jugular vein.
—	55	Syncope, nearly dead. Sympathetic not paralysed, pupil dilates enormously on stimulating sympathetic in neck.
4	—	Improved. Cardiac action very feeble and rapid. Death very shortly ensued. No vomiting. <i>Sectio</i> immediately. Lungs, on section, found full of blood. Stomach distended with meat, emetia and meal found dissolved at cardiac end.

As in the last two experiments, so in this, no vomiting occurred, and I am unable to offer an explanation of the absence of this most common symptom. The dose was a fatal one, and was also introduced somewhat rapidly by increments into the circulation both by the blood-vessels and the stomach. I much regret that I have been unable to repeat this observation. I hope, however, to return to this and other investigations as to the physiological action of ipecacuanha and its alkaloid.

3. *The Local Irritant Effects of Ipecacuanha and Emetia.**Ipecacuanha applied to the Conjunctiva.*

Experiment XXXI.—Placed some pulv. ipecac. in left eyelid of a young rabbit. In five hours there was slight congestion. Inserted a little more of the powder. In twenty-four hours the eyelids were adherent with dried secretion, tarsi red and full, conjunctiva red and very œdematous, some flakes of secretion upon it. Cornea and aqueous humour look a little hazy. In seventy-two hours œdema had passed away, redness of tarsi remained, eye looked hazy. In ninety-six hours the same appearances visible. On the fifth day the conjunctiva was still congested. On the sixth day diminished congestion, cornea becoming duller, but no abrasion of it. Excess of mucous discharge.

Experiment XXXII. was a repetition of the last one. Severe conjunctivitis and keratitis were induced within twenty-four hours; and on the third day the cornea was more decidedly involved, with much secretion from the conjunctiva. M. Bretonneau observed these phenomena, and has also recorded them.

Emetia applied to the Conjunctiva.

Experiment XXXIII.—Some finely-powdered emetia was placed in the eyelid of a young cat. In twelve hours there was congestion and œdema with photophobia. In twenty-four hours much discharge of puriform matter, cornea clear, eyelid closed. The same condition was present two days subsequently. On the fourth day less conjunctival irritation and discharge, but abrasion of the cornea, with some haziness, eyelid still closed. On fifth day conjunctiva looked about natural, but the excavation of the cornea had extended.

Employment of Ipecacuanha Powder in Cases of Ophthalmia.

My colleague, Mr. Bowater Vernon, has kindly furnished me with the following clinical notes of his observations under this head.

Observation I.—An Irishman, æt. 35, had been troubled more or less all his life with chronic vascular opacities of both corneæ, with inverted lashes, and granular lids. Both eyes were implicated, but the right much more so than the left, so that he could only see shadows. Some powdered ipecac., a very small quantity on a camel's hair brush, was dusted into the

right eye on two occasions. The effect of the first application was considerable pain and lacrymation at the time, followed by extreme conjunctivitis; he was indignant and discontinued his visits to the out-patient room for three weeks; at the end of that time, however, he again presented himself, saying he could see better, and with his cornea decidedly clearer. The application was repeated, a very small quantity of ipecac. being used on this occasion. The after results were much the same as in the first instance.

Observation II.—A sailor, æt. 50, who had been much in tropical climates, was much annoyed by repeated attacks of ophthalmia and a thickened condition of the conjunctiva at the inner canthus on each side (false pterygium). Some powdered ipecac. was dusted in very small quantity over the thickened tissue. The application caused extreme pain, followed by acute ophthalmia, requiring very active treatment. When the inflammation subsided, the conjunctiva appeared to have regained a more natural appearance.

Mr. Vernon remarks that the pain caused by the powder is severe and persistent. He tried it in several other cases with much the same results, and thinks it is too powerful and unmanageable an irritant to be used in this way.

Messrs. Herrings inform me that their men have to be very careful in grinding the root, and protect their eyes and mouth. One of them was nearly blind on one occasion from the effects of the dust. They generally complain of some difficulty of breathing and headache when engaged in this work.* No irritation of the skin has ever been noticed. Dr. Stratten in his notes (Appendix No. xlix.) upon Hahnemann's *Organon*, † states that he had known bleeding at the nose and redness of the eyes to occur to persons employed in powdering the root.

* 'The idiosyncrasy of habit which causes this effect is generally noticed the first time of the administration of this drug; but it would appear as if it was sometimes acquired at a late period of life, by a person who may not have previously possessed it. I am intimately acquainted with a lady in whom ipecacuanha produced merely its ordinary effects, until after the birth of her third child. She was on one occasion mixing some of the powder for one of her children, when she was seized with this violent spasmodic affection, and has, from that time, been so susceptible of its influence that the mere withdrawal of the stopper from a bottle containing the powder brings on an attack, though she may not be aware of the presence of the drug. These effects usually remain for about two hours.—Nevins' *Trans. of Lond. Pharmacopœia*, 2nd edit. p. 672. 1854.

† *Trans. Dublin*, 1833; also '*Mat. Med. Pura*,' Hahnemann, *Trans. Hempel*, vol. iii. p. 5.

Ipecacuanha applied to the Preputial Membrane.

In several instances, no signs of irritation were observable after the powder had remained many hours, and had become moistened with the secretion of the parts.

Emetia applied to the Preputial Membrane.

Produced, after two days, redness and irritation. On the third day superficial ulceration commenced, and some enlargement of the right inguinal glands followed. On the fifth day the abrasion had healed, and healthy epithelium was beginning to form.

Ipecacuanha applied to the Skin.

It has long been known that an irritant effect could be produced by ointments and liniments containing the powder. Bretonneau alludes to the very energetic action it sets up in skin denuded of epidermis. Neligan* mentions the counter-irritant action of a liniment composed of ʒiv. of pulv. ipec. to ʒxiv. of olive oil and lard, and remarks that this preparation must be well rubbed into the skin three or four times daily. An eruption of minute vesicles on an inflamed base occurs in from thirty-six to forty-eight hours without causing much pain or constitutional irritation. Trousseau quotes this formula, which I believe was first recommended by the late Dr. Hannay of Glasgow, though its employment was urged by Dr. Turnbull† in lieu of tartar emetic ointment, because no scars resulted from the pustules. I have several times made use of a liniment of ipecacuanha as a counter-irritant, and I find that it acts energetically. The eruption produced differs both from that caused by croton oil and by tartar emetic. Small discrete pustules result with a rather large areola about them. If the liniment be rubbed in too actively or for too long a period, large and ugly pustules are formed, and they leave painful ulcerations, which certainly do not very soon heal. In one case of which I have experience, it seems not unlikely that permanent cicatrices may result from too free use of the embrocation. I have observed that, as is the case with similar counter-irritants, no effect is produced on a part of the skin which has been blistered some weeks previously.

Sometimes powdered ipecacuanha is ordered to be placed on

* 'Medicines, their Uses,' &c., 5th edit. p. 263.

† 'Lancet,' April 7, 1842.

so-called 'warm plasters,' with the intention of adding to their stimulant effect.

It may be noted that the local irritant action of ipecacuanha adds another feature of resemblance to the general likeness between this drug and tartar emetic. Dr. Turnbull recommended an ointment of emetine of which gr. xv. should replace ʒij. of pulv. ipecac. in the formula given above. I suspect that the emetine he employed was not the pure alkaloid, but the *émétine brune* or *medicinale* of Pelletier.

I have witnessed no irritant results from the trials I had made with an ointment composed of gr. j. emetiæ in ʒij. of lard which was well rubbed into the skin, nor with one of twice this strength. Possibly a stronger preparation would act efficiently, but the expense of the emetia, and the doubtful prospect of benefit to be gained, prevented any further trials in this direction. I have not succeeded in producing irritant effects from the application by friction of solutions of emetia in dilute acetic acid of the strength of gr. j. ad flʒij. and gr. j. in flʒj.

Clinical Notes on the Employment of Emetia.

I gave m.v. of solution of acetate of emetia or $\frac{1}{24}$ gr. to a woman, æt. 26, convalescent from rheumatic fever, but with some consolidation of lower lobe of left lung, doubtless in connection with recent pericarditis. No effects were noticed for an hour and a half, when, on rising from bed, the patient felt sick and vomited. She felt nausea for a short time afterwards, but did not vomit again.

Nine days subsequently I gave the same woman gr. $\frac{1}{40}$ of emetia. The physical signs were much the same. There was no cough and no expectoration. In half an hour she vomited without any previous nausea. She felt sick for a short time afterwards, but did not vomit a second time. There was no marked expectorant effect.

To an adult suffering from catarrh with tightness of the chest, I gave $\frac{1}{96}$ gr. and $\frac{1}{48}$ gr. of emetia several times in the day. The action of these doses precisely resembled that of vin. ipecac.; and as happened in cases where repeated doses of the wine or pulv. ipec. were given, it was found that the first one taken in the morning, fasting, produced more nausea than at other times. The queasiness was relieved by taking food.

Hypodermic Employment of Solution of Acetate of Emetia to induce Vomiting.

CASE I.

A tall stout man, æt. circ. 45, came to my out-patient room suffering from gastric catarrh, nausea, and anorexia, the result of long-continued intemperance. I injected ℥iij. of a solution containing gr. $\frac{1}{20}$ of emetine under the skin of his forearm. In less than fifteen minutes the man vomited once. In half an hour there was no further nausea. In a week there was found at the point of injection a little thickening and some tenderness.

CASE II.

I injected $\frac{1}{20}$ gr. under the skin of the thigh in a man æt. 41, who came with dyspepsia, and a history of daily vomiting for two months previously. He usually rejected food within a few minutes after ingestion. Never saw any blood in the ejecta. In ten minutes retching occurred, and in fifteen minutes he vomited two or three times. Within half an hour all nausea had passed off. On the fourth day there was no pain at the site of injection, and only a little induration could be felt where the syringe had pierced the integument.

Ipecacuanha as a Relaxant Expectorant.

The remedy is in high popular favour for its powers in relieving the so-called tightness in the chest which is an early symptom in ordinary bronchitis, and there is no doubt that an early resort to small doses of vin. ipec. may avert severer troubles in this illness. I have frequently known ℥x. to ℥xv. of the wine repeated every hour or two to remove the discomfort and substernal tightness, and to promote expectoration of clear mucus from the bronchi. I found in the case of a lady, æt. 30, suffering from hoarseness, dry cough, and early catarrhal symptoms, that gr. ss. doses of the powdered root placed on the tongue every three or four hours, produced no such effect. I then gave gr. j., and repeated it within an hour and a half. No relief followed. Another grain was taken first thing the following morning; this caused nausea and retching which lasted more than an hour, but no vomiting or expectorant action occurred. The squeamishness was relieved

by taking breakfast, to which there was repugnance at first. I find that ipecacuanha nauseates both in children and in adults more readily when taken into an empty stomach. The same lady can take $\mathfrak{m}\text{xij}$. of vin. ipec. every hour up to the third or fourth time before any nausea occurs. She is sooner nauseated if she is at all low or enfeebled in health. The first morning dose produces nausea in about a quarter of an hour, lasts five minutes, and then passes off. She finds marked relief from three or four hourly doses, and the uneasiness in the chest, due to commencing catarrh, is relieved coincidently with the more free secretion from the bronchi. In this case there was no doubt as to the greater efficacy of the vin. ipec., when compared with the administration of decidedly larger doses of the powder. The soluble form of the remedy is more completely and rapidly absorbed. Still I have known nausea to follow the second dose of gr. ss. of the powder both in children and in adults. The lozenges of the pharmacopœia afford agreeable means of giving the remedy to children, each one containing $\frac{1}{4}$ grain of the powder.

Ipecacuanha in the Nausea of Pregnancy.

The remedy has been advocated for quelling this common symptom of pregnancy. Doses of $\mathfrak{m}\text{j}$. (vini) every hour, or three times a day are reported to be sufficient for the purpose.* With reference to the prescription of small doses frequently repeated, I may state my experience here that I find it impossible to secure that the patients take them. However distressing a symptom during pregnancy nausea may be, the greater number of sufferers have their duties in this work-a-day world, and, practically, cannot take hourly doses of medicine. I have employed small doses $\mathfrak{m}\text{ij}$. to $\mathfrak{m}\text{v}$. of the wine in a little water two or three times at short intervals, sippings, in the nausea of pregnancy, and I have certainly known decided relief afforded sometimes. I have also tried $\frac{1}{20}$ gr. of emetia (or $\mathfrak{m}\text{j}$. of a vinum emetia)† placed on the tongue, and have found this to answer unequivocally in a few minutes. This last dose is an emetic one when placed under the skin. But I am bound to record that I have known the remedy to fail most completely, and have succeeded in relieving the symptom sometimes with a few drops of spirit of chloroform, or with the same quantity of tincture of gentian and oil of peppermint. Whatever induces

* 'Handbook of Therapeutics,' Ringer, p. 295.

† Vide p. 33.

primarily some amount of stimulus upon the branches of the vagus seems then to relieve this symptom, but I think it highly probable that ipecacuanha has more than an ordinary effect of this kind, for it appears to exert a decided influence upon the uterus, to which allusion will be made later.*

Ipecacuanha in Cases of Slow Digestion and Constipation.

There is strong evidence in favour of this remedy in properly selected cases of indigestion due to insufficient gastric secretion. It is indicated when the tongue is coated, and the mouth constantly sticky or dry, and when there is complaint of a 'load on the stomach' at the same time. This condition may be arrived at either as the result of an acute debauch, intemperance of food or strong liquors, or as a phase of long-standing indigestion. It has been well termed an *embarras gastrique*. Ipecacuanha is of signal service here, and no better formula for its use exists than the old-fashioned, so-called, dinner-pill, in which rhubarb also is an ingredient. M. Martin Solon† employed gr. vj. to vij. of ipecacuanha alone, three times in the twenty-four hours in such cases.

There is something decidedly noteworthy, however, in the combination of rhubarb with the remedy. The two drugs work better together in affording relief than either singly in the same case. Ipecacuanha has no doubt the merit of directly increasing gastric secretion. According to Budd,‡ it possesses this power in a greater degree than any other medicine we possess, and he quotes the opinion of M. Daubenton,§ that the remedy acted by increasing peristaltic action in the stomach, and imparting energy to its glands. Rhubarb is observed to have a peculiar calmative effect upon the stomach, and this is noticed very shortly after taking it. Its astringent action is a later one. Now the combination has in addition the power of clearing the alimentary canal very effectually. This action is excellently well observed in the case of the compound rhubarb pill, five grains of which, if combined with one of powder of ipecacuanha, act as efficiently as ten or fifteen grains of the pill by itself. Thus the addition of one grain of ipecacuanha powder to five of compound rhubarb pill, acted upon the bowels in

* Vide p. 31.

† Wilson Fox, 'Diagnosis and Treatment of Dyspepsia,' 1st edit. p. 181.

‡ 'Diseases of the Stomach,' p. 327.

§ 'Observations on Indigestion, and the efficacy of Ipecacuanha in relieving it,' &c., Trans., Lond. 1807. Budd believes that this writer was the first to introduce ipecacuanha for slow digestion.

three cases in which I tried it, three times in two of the persons, and once in the other, the last being a lady of somewhat constipated habit. It is found as a rule that the five-grain pill by itself hardly exerts any aperient action.

Ipecacuanha and Emetia as Remedies in Dysentery.

The early history of this drug is intimately connected with its employment in these cases, and is sufficiently well known. Under this heading I propose to record some experiences of its use, and also that of its alkaloid. When it was first introduced into Europe, large doses were recommended. 'Nothing to that effect can be clearer than the brief account of Marcgraf, who first, with Piso, in 1648, made its virtues known. They both recommended one or two drachm doses to be given in dysentery.'*

It is remarkable, however, to find that in course of time small doses only were employed in the treatment of this disease. 'How European physicians came to substitute one, two, or three grains for Marcgraf's one or two drachms, I do not know, but the enquiry would be curious could we follow it out well.'† The remedy was certainly regarded as infallible. Of the *Radix antidysenterica* Baglivi wrote:‡ 'Radix ipecacuanhæ est specificum, ac ferme infallibile remedium in fluxibus dysentericis,' &c. He mentions that he learnt its virtues from a Dr. William Sherard, at Rome.§ It seems that in 1831 the Madras Medical Board published a number of Reports by different medical officers, showing the efficacy of gr. v. doses given every hour in acute dysentery, till frequently hundreds of grains were given in a short period. The credit of re-introducing the method of giving large doses of ipecacuanha in dysentery appears to be due to Mr. Docker. ||

Dr. Elliotson¶ stated as his experience that he found no peculiar antidysenteric properties in ipecacuanha, and condemns the plan of giving the drug so as to create sickness. He appears to have followed the plan of Dr. Akenside,** who

* Prof. Christison. Private letter. † Ibid.

‡ 'Prax. Med.' Lib. i. p. 109, 7th edit. Ludg. 1714.

§ This must have been William Sherard, D.C.L., Fellow of St. John's College, Oxford, a famous botanist, who was English Consul at Smyrna, bequeathed his Herbarium to his University, and founded the Professorship of Botany there in 1731. Roll of the Royal Coll. of Phys., Dr. Munk, vol. ii.

|| Art. Dysentery. Prof. Maclean, C.B., Reynold's 'System,' vol. i. 'Lancet,' July and August 1858.

¶ 'Pract. of Med.' p. 1059.

** 'De Dysenteria Commentarius,' p. 36. 1764.

recommended three or five grain doses every six hours. These doses, however, are far too small, and such a practice differs materially from that now understood as treatment by large doses. Dr. Akenside was fully impressed with the value of the drug in dysentery, and thus explains its action: 'Hujus vero efficacia e duabus facultatibus pendere videtur: primo nempe, quod alvum solutiorum reddat, atque ita humorem, quo morbus nascebatur et quo continetur, e corpore expellat; secundo vero, quod intestinorum tunicas relaxet, atque torminum violentiam infringat; unde doloris maxima pars detrahitur, et adeo tolerabilis sit morbus, ut plerumque sine magna molestia æger expectare potest dum materiem morbidam dejectiones e corpore penitus egresserint.'

The theories alleged in explanation of the remarkable virtues of this remedy in these cases are many and various. Pereira* attributed them in part to an antiperistaltic action set up in the intestines, and also to the diaphoretic effect induced. Others, as Cullen† and Sir George Baker,‡ believed that the drug was most effectual when it purged. Maclean agrees in this opinion, which, I think, must be held by all who have witnessed the use of ipecacuanha in large doses. He states: 'I think it probable that ipecacuanha owes much of its usefulness in dysentery to its action as an evacuant. It is a blood depurant of an effective kind. It appears to increase the secretion of the whole alimentary canal, as well as that of the liver and pancreas; under its use tormina and tenesmus disappear, and feculent evacuations are more quickly restored than by any known remedy.' §

Dr. Ringer || observes that this remedy is recommended in epidemic forms of dysentery, and is especially indicated where there is more blood than slime in the stools, and when there is much tenesmus; further, that it succeeds admirably in some epidemics, and seems to fail in others.

A. G. Richter, ¶ who observed three epidemics of dysentery at Göttingen during the end of the last century, records that at the beginning of the disease he gave an emetic when there was an indication for it, and he always preferred ipecacuanha, which seemed to have more effect upon the pains than tartar emetic.

The homœopathic practice of giving the drug in this disease

* 'Mat. Med.' vol. ii. part ii. p. 1598.

† Ibid. edit. 1789, vol. ii. p. 477.

‡ 'De Dysenteria,' 1761.

§ Ibid.

|| Op. cit. p. 296.

¶ 'Med. and Surg. Observations,' Transl. Spens, Edin. 1794.

is directed, apparently, against the symptom of hæmorrhage; at all events Hahnemann* has stated that 'experience has repeatedly shown that it is wholly unsuited to dysentery. It is only of use in diminishing the excess of blood, and some kinds of abdominal pain in dysentery, but does not affect the other symptoms.'

Again, in his 'Organon of the Healing Art,'† he asks: 'How would it have been possible to stop dysentery with ipecacuanha, as effected more than once by Baglivi, &c., &c., if this medicine did not of itself possess the faculty of exciting hæmorrhage, as Murray, &c., have witnessed?' Hempel‡ also observes: 'It only moderates the bloody discharges, it does not act upon the tenesmus.' A more modern homœopathic practitioner, in a recent book,§ states that 'some cases of dysentery require ipecacuanha. They are characterised by the large quantity of mucus and greenish evacuation (as well as blood) and by the moist furred tongue.' This clinical description, however, will apply to most cases of the disease at some period of their course.

It seems almost unnecessary for me to append the following testimony in favour of the plan of giving large doses of this remedy in dysentery, since there is now remarkable unanimity amongst all practitioners who have had to treat this disease in countries where it is constantly prevalent. ||

I insert the following notices, however, which illustrate this practice in both the West and East Indies. My friend, Mr. Alexander Hunter, Colonial Surgeon at Belize, British Honduras, informs me ¶ that in cases of acute dysentery he commences the use of ipecacuanha by giving one scruple of the powder in a little water, or in three large pills if the patient preferred it. He has not observed any intolerance of it by the stomach. Beyond keeping the patient as quiet as possible, and giving nothing for an hour before or after its administration, no precaution was adopted. The effects produced by the first dose were lowering of the pulse, slight heat of skin and diaphoresis, with diminished frequency and quantity of stools. A second dose, of twenty-five grains, four or five hours after the first, had the effect of allaying all the symptoms, and altering the

* 'Mat. Med.' Hempel, p. 531.

† Transl. Dr. Stratten, p. 63.

‡ 'Mat. Med.' p. 528.

§ 'Applied Homœopathy,' &c., p. 105. Dr. Bayes.

|| Mr. Docker's plan is to give 3ss., gr. xl., or ʒj. doses of the powder, according to the urgency of the case, and to repeat it every four or five hours. He administered fl ʒss. of laudanum previously, and applied sinapisms to the epigastrium.

¶ Private letter.

character of the discharges, the amount of blood being much reduced, and the mucous and faecal matters increased. It is seldom necessary to administer more than two or three doses, and, observes Mr. Hunter, 'in contrast with other modes of treatment, I have seen the happiest results follow the use of ipecacuanha when other remedies have entirely failed. When there is much pain and restlessness, I have given a warm bath and some preparation of opium, but I do not consider these essential in this plan of treatment. In chronic dysentery I cannot speak so favourably of the remedy in large doses, as it produces too much depression.'

I may allude here to the experience of Dr. Yandell,* practising in the Valley of the Mississippi, who extols the remedy in dysentery, and has found it of value when other plans of treatment have failed. He employs ten or twenty grain doses given out of peppermint water. He, however, precedes the draught with a hypodermic injection of morphia to secure tolerance of it by the stomach.

The following notes are from my friend and colleague in the service of the Great Indian Peninsula Railway Company, Mr. William S. Eccles, who has sent them to me as a record of his experience in the Bombay Presidency up to July 1869.

'I have used emetia in thirty-five cases: twenty-six of these were of recent dysentery, and nine of aggravated diarrhoea. It was always given according to the following formula: Emetiæ gr. iij., morphiæ hydrochloratis gr. ij., sacchari albi gr. xij. M. ut fiat pulvis. Div. in chartulas vj.

'One powder was directed to be taken every four or six hours, according to the urgency of the symptoms.'

Race	No.	Cases of Dysentery	Cases of Diarrhoea	Recovered	Relieved	Not benefited	Number of cases cured by gr. iij.	Do. do. by gr. vj.	Do. do. by gr. ix.	Do. do. by gr. xij. or more	* Case of Dysentery. † Cases of Diarrhoea. ‡ Were cured by doses of ℥j. of pulv. ipecac. and gr. † of morph. hydro.
Europeans .	7	7	0	5	2	0	3	1	2	1	
Natives . .	27	19	8	* 16 † 6	* 0 † 3	‡ 2	* 14 † 6	* 2 † 1	* 1 † 1	* 1 † 1	

'The above table will, I think, explain itself. It shows that the ordinary dysentery met with in Bombay may be easily cured by three or six grains of emetia combined with two to four of morphia. In only three of the above patients was

* Note in 'Practitioner,' Oct. 1869, p. 254.

there any affection of the liver, and to the non-existence of this complication I attribute the almost complete absence of vomiting after the administration of the medicine. Besides its curative effects, I find that the drug frequently produced a great desire for food; many of my patients have besought me to allow them to take something more substantial than the milk and farinaceous diet which was ordered for them. So far I have found emetia an efficient substitute for ipecacuanha in the treatment of dysentery; and it has the advantage of being less nauseating. As it is so expensive I shall confine my further researches upon it to Europeans only.

‘I have now had large experience in the treatment of dysentery, and I find no drug equal to ipecacuanha, or its alkaloid, in its curative effects on the disease. I give the powder in scruple doses, generally in pills, a quarter of an hour after a draught containing half a drachm of liq. morph. hydrochlor. in half an ounce of water, and this is repeated every six or eight hours, according to the urgency of the symptoms. If vomiting occurs after the first dose, then a mustard plaster is ordered to be applied over the epigastrium. Any complications, such as disorders of the liver or spleen, require to be treated accordingly, as they frequently interfere with the action of the ipecacuanha. Milk diet is enjoined until the motions are natural, and no food is allowed within three hours before or after each dose.

‘My belief is that uncomplicated dysentery, as met with among the Company’s employés here, need never be a disease of more than a week’s duration, if treated as just now described.’

One is seldom called upon to treat acute dysentery in this country, but frequently cases of chronic colitis come before us in which an acute attack supervenes, and in these we may have recourse to treatment by large doses of ipecacuanha.

I have known benefit to follow this plan. In the following instance, however, no satisfactory result occurred, although relief was afforded.

Chronic Colitis. Employment of Enemata of Ipecacuanha, and of large Doses by Mouth. (From Notes by Mr. Ferguson, Clinical Clerk.)

J. P., æt. 50, admitted into Mark Ward under Dr. Duckworth’s care, April 26, 1871. Spare man, of ruddy complexion, has come up from Stroud, Gloucestershire. Physical signs, nil; tongue pale, flabby; pulse 80, small, compressible,

regular; temperature normal; appetite fair; no thirst; bowels open eight times since previous day, motions almost wholly blood; has no hæmorrhoids; no localised tenderness in abdomen, but there is pain during defæcation. This condition commenced gradually, two years ago, there being very little blood passed at first. Has been under treatment, without improvement during last twelve months. Has been able to do light work up to four months ago.

April 28.—Pulv. ipecac. ʒss., decoct. amyli. ʒij.; ut fiat enema. The injection was retained for four hours. In the next twenty-four hours the evacuations were reduced to four, but the improvement did not last out one day. Beef-tea and milk diet.

May 1.—Has relapsed to his original condition, less pain however, in lower bowel. Rep. enema hâc nocte.

May 2.—Enema retained several hours, but afterwards six motions were passed. Rep. enema.

May 3.—Five slimy and bloody motions.

May 5.—Ordered tr. opii. ℥xij., et post semihoram pulv. ipecac. ʒss. The first dose caused sickness, subsequently only nausea and giddiness occurred. The powders were continued once a day for several days, but with no marked beneficial effect. There was a decided diaphoretic action exercised.

After this date castor oil was employed, and doses of bismuth and bark-decoction, but with no benefit, and the patient being suddenly summoned to his home, left the hospital but little relieved.

As to the vomiting which occurs when this plan of treatment is pursued, it is alleged that the remedy acts not less well on this account. Some advocates of large doses indeed prefer that an emetic action should occur, and I think I can confirm this belief from such experience as I have had. Pereira's opinion that the tendency of the drug to produce an anti-peristaltic movement of the intestines contributed to its anti-dysenteric properties, must be held to be at least very doubtful, and the evidence points rather the other way.

Decided benefit resulted in the following case of acute dysentery from treatment by large doses.

F. S., æt. 27, station master at Callian, Bombay Presidency, had been over four years in India. Kept his health till July, 1869, when he had fever and ague. In February, 1870, began to complain of griping pains in bowels, but had no looseness. Three weeks afterwards, the pains became more severe, so that he was 'doubled up,' on and off, for some days. Sent to

Bombay on leave for a fortnight, and seen by Mr. Eccles, who found some enlargement of the liver. After remaining a week in bed, returned up country to his duty. Was compelled to leave his post owing to a return of the pains, and came again under Mr. Eccles's care. Had some diarrhoea and blood in stools before leaving Bombay in April. He kept well as far as Suez, but on coming slowly through the Suez Canal at that hot season, severe dysentery came on, and at Port Saïd he was passing thirty stools a day. Came on by Gibraltar to Liverpool. Reached London, May 31. Purging of bloody stools, with straining, though not much griping, continued till July 8. He was attended by a practitioner, but obtained no marked relief till he was seen by Dr. Andrew Clark, who, in consultation, prescribed large doses of ipecacuanha. I have to thank my friend Dr. Clark for kindly sending me the following note of his treatment of the case:

‘I enjoined strict confinement to bed, a rigid farinaceous and milk dietary, hot sponging or hot bathing every night and morning; ipecacuanha and large enemata. No stimuli. The ipecacuanha was given in this wise:

‘10 A.M. Dose of opium, ammonia, and chloric æther.

‘10.15 A.M. A large, hot poultice, with mustard over belly.

‘10.30 A.M. ℞j. of pulv. ipec. in a little syrup of lemon.

‘Patient ordered to remain scrupulously quiet on back, with the head low, and to resist every effort to be sick.

‘8 P.M. The process repeated.

‘10 A.M. next day. Ditto ditto.’

The first dose was rejected; after the second one he had relief, and the amount of blood diminished. He took a powder twice a day for three days. (This information came from the patient himself. He came before me ere he returned to India last November, and was eloquent on the subject of the ipecacuanha cure.)

‘The enemata,’ writes Dr. Clark, ‘were either weak solutions of nitrate of silver, or of water with a little creasote. On the third day the disease was subdued, and was ultimately cured by perntrate of iron—as I think.

‘Judging from my experience, which, at the London Hospital, is not inconsiderable, the ipecacuanha is invaluable where there is no great amount of thickening or of ulceration of the large bowel. In advanced cases with thickening, ulceration, and wasted mucous membrane, it is injurious. I begin treatment with castor oil—I do not think the preliminary opiate generally necessary if the patient is kept on his back and properly in-

structed—and I find that enemata of nitrate of silver, creasote or perntrate of iron valuable adjuvants.’

The following strong testimony of Dr. Akenside as to the wide applicability of the drug in this disease may be read with interest. He wrote from ample experience, for dysentery was more common in London a century ago than it is now: ‘Neque interest utrum acuta sit dysenteria, an chronica: utrum sanguinem habeant dejectiones, an muco tantum constent. In omni porro ætate hominum, sexu, conditione; et per omnes anni tempestates salutarem suam vim æque edit medicamentum. Nolo equidem affirmare nunquam id meam spem fefellisse: rarius tamen hoc ab illo expertus sum quam ab alio medicamento, si unius corticis Peruviani adversus febres intermittentes virtus excipiatur.’*

Professor Maclean, whose experience of this treatment is perhaps the largest, urges the use of it in acute and subacute exacerbations occurring in the course of chronic dysentery, and he declares that many cases of the chronic form are not the results of unhealed ulcers, but are met with where no breach of surface is detectable, although there is pigmentation and thickening—sequelæ of previous ulceration. It would not be good practice to treat ordinary cases of chronic dysentery with ipecacuanha in any dose, but in the event of an acute outbreak in the course of such a case, the drug is indicated. The continued clinical and dead-house researches of our Indian brethren will no doubt before long afford us more exact data for the employment of this ‘remedium infallibile.’

Mr. Hulke† and others have witnessed to the great value of ipecacuanha in the dysentery which occurred during the Crimean war. The remedy does not seem to have been employed much in France last autumn (and dysentery was rife at Sedan and other crowded localities), partly because there was scarcity of the drug,‡ and partly, I imagine, because the revived practice of using large doses is not yet fully recognized on the Continent.

* Op. cit. p. 39.

† Pathological Society's Meeting, October 1870.

‡ We may hope that there will soon be no scarcity of this drug, for there is now an active cultivation of it in India. Professor Balfour and Dr. Hooker have sent plants there, and lately indeed to Jamaica, where it is hoped that they may thrive. The late Dr. Thomas Anderson, Director of the Botanic Gardens at Calcutta, first proposed to the late Lord Canning that ipecacuanha should be introduced into India, and judging from analogy of climate and the isothermal lines, he foretold the probable success of the experiment.

Local Action of Ipecacuanha in Dysentery, Tubercular Enteritis, and other Inflammatory States of the Colon.

It is a fashion in India to employ an injection of the drug in dysentery. Dr. Graves* recommended the use of an infusion as an enema.

The plan was tried in the hospital in the case of a woman under Mr. Savory's care, who was sinking apparently from uncontrollable dysenteric diarrhœa, which ensued after an operation for strangulated femoral hernia. A scruple of the powder was given in four ounces of decoction of starch, with some laudanum, by the bowel, and the most marked relief followed. A second injection was given, and further improvement ensued. The usual remedies, astringents, &c., had previously failed to check the purging. No nausea or vomiting occurred. The late Dr. Hillier† was led to employ this means in a case of dysenteric diarrhœa in a child. He gave full doses, and with fair success. He likewise suggested that the plan might prove of use in those very obstinate cases of diarrhœa which occur when the lower bowel is the seat of tuberculosis and ulceration. I tried in one such case an enema containing half a drachm of powdered ipecacuanha in two ounces of starch-decoction. No relief, however, was afforded.

Observations upon the Hæmostatic Action of Ipecacuanha.

The sentence already quoted from Baglivi, wherein the drug is lauded as infallible in dysenteric bloody flux, terminates with the words 'aliisque hæmorrhagiis sanguineis.' Accordingly, in Trousseau and Pidoux's *Materia Medica*,‡ and in some other such works, the remedy is recommended in menorrhagia, hæmoptysis, immoderate flow of blood from hæmorrhoids, and in uterine hæmorrhage connected with the puerperal state. Trousseau used emetic doses in pulmonary apoplexy and bronchial hæmorrhage, and states that this treatment is more inoffensive than it would appear on first consideration.

This leads me to allude to the following remarks of Cullen and of Dr. Bryan Robinson upon this subject. The latter §

* 'Clinical Medicine,' 2nd edit. p. 167. Dr. Waring gives this reference, but I have been unable to find it. I am indebted to his 'Manual of Therapeutics' (Churchill) for this and several other bibliographical references.

† 'Med. Times and Gazette,' January 1864.

‡ Vol. i. p. 742.

§ 'Observations on the Virtues and Operations of Medicines,' p. 63. London, 1752.

states that 'vomits lessen the motion of the blood during the whole time of their operation, and almost quite stop it during the action of vomiting by the strong contraction they give to the muscular system.

'And from these effects we discover the great usefulness of vomits in stopping hæmorrhages from small vessels, . . . or from an irregularity and disproportion in the motion of the blood and other fluids in different parts of the body.'

Cullen* states that, upon the recommendation of so good an authority, he tried the effect of emetics in hæmoptysis, and found they were beneficial in several cases, 'but in one case the vomiting increased the hæmorrhagy to a great and dangerous degree, and the possibility of such an accident again happening has prevented all my further trials of such a remedy.' Still he believed there was a place for this treatment, and that it acted by taking off the determination of blood to the lungs just as, for example, carriage exercise does. Cullen preferred this explanation to the theory of Bryan Robinson, which supposed that a constriction of the small vessels occurred during vomiting. He, however, thinks some strength is given to this view by the fact that nauseating medicines have likewise proved of service in uterine hæmorrhage, and I shall presently quote strong evidence in favour of this. Graves† employed ipecacuanha in cases of hæmorrhage from the bowels, and preferred it to acetate of lead. He also quotes the experience of Dr. Sheridan, of Dublin, who showed that it might be given with success in hæmatemesis, although it even produced vomiting; and he refers to 'Richter, the author of the German Elements of Surgery,' as the first who pointed out the anti-hæmorrhagic effect of ipecacuanha. I have been unable to discover any notice of this in the only book corresponding to this title.‡

Dr. Wharton Hood has related two cases in which severe hæmorrhage, following operations for removal of the tonsils, was checked by emetics.§

Ipecacuanha in the Treatment of Hæmoptysis.

It is quite exceptional to find the emetic plan of treatment recommended for the removal of this symptom, yet it well merits attention and practice. Trousseau|| has, more than

* Op. cit. vol. ii. p. 470.

† 'Clin. Med.' 1st edit. 1843, p. 273.

‡ Op. jam. cit. p. 48.

§ 'Lancet,' October 29, 1870.

|| 'Clin. Med.' vol. iii. p. 153. New Syd. Soc. Trans.

any physician, called attention to the value of it. Graves,* too, employed the drug in these cases. He generally bled his patient first, and next gave two grains of the powder every quarter of an hour till some improvement occurred, and then every half-hour till the bleeding ceased. He believed that there was something specific in the remedy beyond the mere nauseant action, for he declares that tartar emetic does not so effectually arrest the hæmorrhage. Again, he urges the use of the drug in nauseating doses, constantly repeated, until full vomiting is produced over and over again in unmanageable cases of hæmoptysis. 'When the parenchymatous hæmorrhage is obstinately recurrent,' remarks Trousseau, 'ipecacuanha is a remedy which seldom fails. . . Administered as an emetic, it is more to be relied on in the treatment of what is called bronchial hæmorrhage.'† By parenchymatous hæmorrhage is meant what is usually termed pulmonary apoplexy, a condition almost always associated with heart disease.

Of course it must be remembered that many cases of hæmoptysis require no treatment beyond rest and the application of suitable hygienic measures,‡ but there are not unfrequently cases met with where active means must be employed. If the ipecacuanha treatment be selected, ten grains of the powder should be given in a little water every ten minutes during half an hour, afterwards less frequently. Active vomiting, if it occurs, is no contraindication for continuing the dose should the hæmorrhage not have ceased.

Some noteworthy examples of this treatment are given by Trousseau, who ends his lecture on the subject of hæmoptysis with these remarks:§ 'The hand trembles when it administers this remedy for the first time. We are accustomed to prescribe the greatest possible quietude to our hæmoptoic patients . . . the very most we allow them to do is to breathe, and so frightened are we for congestion, even passive congestion of the lung, that we act as if we placed them in peril by permitting them to make the slightest effort. Yet here we are giving a medicine which produces vomiting, during which the face swells, the blood stagnates in the veins by which it is being conveyed to the auricles; and, consequently, the pulmonary veins become distended. One might expect that such

* Op. cit. p. 273.

† Op. cit. p. 153.

‡ Vid. 'Practitioner,' Aug. 1870. Paper by myself on Treatment of Hæmoptysis with reference to the employment of Styptics.

§ Op. cit. p. 154.

a treatment would cause the hæmoptysis to return in a much more profuse degree; but in place of this, it is stopped in nearly every case. Here is one proof more of the small reliance to be placed on theoretical explanations, and of the value of empirical facts, without which, indeed, therapeutics would be a nullity.'

Pereira quotes the practice of Dr. Aasheim, a Danish physician, who gave a fourth of a grain of ipecacuanha every three hours during the day, and every four hours during the night in cases of hæmoptysis.

I have tried this plan of treatment in several cases of hæmoptysis, which I now subjoin. I could record other instances in which I did not push the remedy sufficiently. I am satisfied of the value of it, and believe that it merits more general employment in severe cases. It is applicable to relieve the blood-spitting which is so frequent amongst artisans who suffer from pulmonary vesicular emphysema, and to cases of hysterical hæmoptysis, also to severe instances of hæmorrhagic deviation.

i. *Aneurysmal Hæmoptysis.*

In a severe case of hæmoptysis due to aortic aneurysm in a bargeman æt. 30, I gave twelve minims of vin. ipec. every three hours. The bleeding ceased in twelve hours. There had been two previous attacks of hæmorrhage which lasted a considerable time on each occasion. Slight nausea was felt when the dose was taken on an empty stomach.

ii. *Hæmoptysis. Emphysema of Lungs.*

C. B., æt. 34. Hæmoptysis occasionally for last twelve months. Oct. 17.—Spits up about a drachm of bright blood with each cough. Ordered one drachm of vin. ipec. (=gr. iij. pulv. ipec.) ter die. 19th.—All hæmoptysis ceased. The man declared that this attack was checked sooner than any former one. He used to take acids.

iii. *Bronchial Hæmoptysis.*

W. F., æt. 27, a cooper, came with severe hæmoptysis. He coughed up about a teaspoonful of bright frothy blood every few moments. This state of matters had lasted for four hours ere I saw the man. The bleeding came on the day previously, and continued some hours. Exertion increased it. He could not lie down for the suffocating sensation in his chest, pro-

duced by the blood accumulating in the bronchi. Has had slight hæmoptysis before on several occasions. Heart beating rapidly; sounds clear. I gave, at once, a scruple of pulv. ipec. in an ounce of water. Within half an hour the bleeding had ceased. No nausea was occasioned by the dose, and the man walked away feeling his respiration free, and his chest clear. He took with him another scruple of the powder in case of relapse, and was ordered the Hospital mixture of sulphate of magnesia and dilute sulphuric acid. His father died of phthisis, but no others of his relations. I did not, of course, examine the chest, and I saw no more of the case.

Ipecacuanha in Uterine Hæmorrhage.

I have no experience to record of the use of the drug in these cases, as I am seldom called upon to treat them, but I am satisfied that the plan already described is applicable to severe uterine bleeding. In the Dublin school it has been much recommended. The emetic effect appears to be necessary to secure complete styptic action. Mr. Higginbottom* of Nottingham, has lately borne strong testimony in favour of this remedy. He states that he has often seen the effects of an ipecacuanha emetic in raising quickly the sinking powers of the system in extreme cases of syncope, hæmorrhage, &c. He was led to employ an emetic to check flooding after delivery, from having observed that stimulants and the use of ordinary measures often failed, but that when the distended and irritated stomach emptied itself, the hæmorrhage ceased. He records several noteworthy cases in which the emetic practice was signally successful; and, what is of more particular interest, it checked the bleeding after ergot of rye had failed.

Trousseau,† Tyler Smith, and others have expressed their belief that ipecacuanha exerts some specific action upon the uterus. The former employed it much after childbirth for some days, and believed that it was of service during the changes the uterus underwent. The latter‡ thinks the drug acts not only in virtue of its emetic power, exciting contraction of the abdominal muscles, and thereby compressing the uterus, but also because it increases the contractile power of the organ

* 'Ipecacuanha in Emetic Doses as a Stimulant,' &c. By John Higginbottom, F.R.S. 'Brit. Med. Journal,' Feb. 1869.

† Trousseau and Pidoux, 'Mat. Med.'

‡ 'Lancet,' Dec. 1848.

beyond what might be expected from the mere secondary effects of vomiting. (We have a report of Mr. Higginbottom,* however, upon a case of flooding, which was at once checked by the vomiting induced from irritation of the fauces with a feather.)

Dr. Tyler Smith calls attention to the remarkable powers of a drug which appears to affect both the medulla oblongata and the latter part of the spinal chord.

My friend Mr. Godson has tried the effects of four-grain doses of the powder twice repeated, in two cases of profuse bleeding from fibroid tumour of the uterus, and found the results satisfactory, though the hæmorrhage recurred when the effects of the drug passed off. I trust that a more extended trial of this plan of treatment may be made in cases of severe flooding. Not less than a scruple dose should be employed, and it should be repeated a second or third time if necessary.

Ipecacuanha Emetics in Chronic Urticaria.

This practice is not very generally known, and yet is worthy of more frequent employment.

There is, I believe, too much objection entertained to the plan of giving emetics at the present time; and it is too generally expected that the rapid advances of medical art enable us, as practitioners, to discard so-called old remedies which, for the most part, are regarded as at all events unpleasant, if not in every instance nauseous. I learned this practice from Mr. Wood, our late apothecary at the Hospital; and there can be no doubt of its value in those cases of urticaria which do not yield to ordinary treatment in a few days, and cannot be traced to any special dietetic error. Half a drachm of the powder should be given as an emetic each morning, or every alternate day.

Ipecacuanha as a Remedy in Snake Bite, &c.

I have no experience to record under this heading, but the subject is of interest. I cannot learn who first recommended the local application of the drug to the bites of snakes and other venomous creatures, but it is handed down as knowledge derived from a naval surgeon. It is the practice in India, however, to apply a poultice made with ipecacuanha powder to the wound. It is thought, Dr. Waring states, to be specific as well as pain-relieving. Mr. Henry Collet† has reported a

* Loc. cit.

† 'Brit. Med. Journal,' 1847.

case in which he afforded very marked relief to a patient who was bitten by a centipede. He applied ordinary vin. ipec. to the wound.

Notes on the Pharmacy of Ipecacuanha.

I have employed chiefly the powdered rhizome and the vinum ipecacuanhæ. Messrs. Dinneford have also prepared for me a tincture, with proof spirit, of the same strength as the wine, viz. twenty-two grains of the rhizome to a fluid ounce of spirit. I also made a wine of emetia by dissolving one grain of the pure alkaloid in half an ounce of sherry. It is necessary to triturate the emetia in a glass mortar, and add the wine gradually in order to secure a perfect solution. A waxy-like portion remains for some time, but it can eventually be made to dissolve by continued friction. Five minims of this wine contains one twenty-fourth of a grain. The tartaric acid is the solvent principle in the wine. In each of these three preparations a sediment occurs sooner or later, of a brownish-yellow colour, and on agitation the specimens become muddy. Pharmacutists, therefore, filter the wine occasionally, and sometimes they endeavour to clarify it by adding tartaric acid. This latter method fails, and the former plan is only effectual for a time. Other chemists agitate their bottles, and dispense the wine in a muddy state. The tincture of homœopathic pharmacy used to be made with rectified spirit, and I am informed that this throws down no precipitate. Proof spirit is now ordered for most homœopathic tinctures, and a sediment accordingly is met with in the bottles of the mother tinctures. I have examined this deposit, and find that it consists of a yellowish granular amorphous matter as viewed under the microscope. The only solvent for it that I can find is liquor potassæ. It has been supposed to be glucose or starch, but it is neither the one nor the other; and I was at a loss to know what it was till I was kindly informed by Professor Attfield of the Pharmaceutical Society. I found that tartaric and acetic acids had no solvent action upon it, neither had æther, chloroform, alcohol, or ammonia. Hence it could not be emetia, for this alkaloid is soluble in acids and alcohol, and only slightly so in æther, while it is insoluble in alkalies. The reaction of the precipitate is acid, and it has a bitter and somewhat aromatic taste. According to Dr. Attfield, it is a mixture of acid tartrate of potassium and cephaelate of emetia.* ‘The cause of

* Private Letter.

its appearance is, I presume, the slow formation of alcohol from the residual sugar in the sherry, a menstruum being produced in which the tartar is decreasingly soluble. With the tartar is deposited the natural salt of the alkaloid, because the former is the solvent of the latter.

A proof spirit tincture of ipecacuanha is not more stable than ipecacuanha wine; what is wanted to retain the alkaloid salt in solution being not alcohol but acids, or such an acid salt as cream of tartar.'

I find that the addition of three or four minims of liquor potassæ to a drachm of the muddiest wine or tincture of ipecacuanha renders it quite bright and clear, and of the colour of old port wine. Liquor ammoniæ darkens but does not clarify it. The bitterness and aroma of the sediment are due to the ipecacuanhic or cephaelic acid which is described by Pelletier as bitter.* Professor Attfield states that the deposit slowly increases in amount, the therapeutic strength of the wine decreasing in proportion.

According to Garrod† a fluid ounce of the wine contains about twenty-two grains of ipecacuanha. The late Dr. A. T. Thomson‡ believed that sixteen ounces of sherry took up about a hundred grains of the soluble matter of ipecacuanha.

According to the first statement one drachm of the wine should contain two and three-quarter grains of the drug, while on Dr. Thomson's view, the same quantity would contain about three-quarters of a grain of soluble matter of the rhizome. The homœopathic tincture contains one part in ten of proof spirit.

I should urge the introduction into a future edition of the British Pharmacopœia of two preparations of ipecacuanha, viz. an acetum ipecacuanhæ, and a syrup of the aceto-alcoholic extract. Acetic and tartaric acids, and rectified spirit, are the best solvents of emetia. Mr. G. Johnson,§ a provincial pharmacist, has proposed a formula for the first of these preparations, and he has also recommended that a weak alcoholic tincture should be employed which should also contain four grains of tartaric acid in the ounce. He advises four parts of distilled water to be added to one part of rectified spirit, and this menstruum, he believes, would secure the most stable preparation of ipecacuanha. The syrup of the United States Pharmacopœia is one of the best of all the preparations of the drug. It is made from the aceto-alcoholic extract. Mr.

* Pereira, op. cit. p. 1595. † 'Essentials of Mat. Med.' 3rd edit. p. 255.

‡ Pereira, op. cit. p. 1599.

§ 'Pharm. Journal,' 2nd series, vol. ii. p. 303.

Hanbury, of Plough Court, informs me that this would well supersede the wine in many formulæ, as, for example, in combination with almond emulsion, the flavour of which is rendered unpleasant to children by the wine. One drachm of the syrup contains the equivalent of three grains of the powdered rhizome, and the dose can be regulated accordingly. It should be borne in mind that children appear to be less speedily nauseated by ipecacuanha than adults.

I believe that the drug is generally to be met with in a pure state; the most probable adulteration is with the rhizomes of *psychotria emetica*, a striated variety called Peruvian ipecacuanha. This plant is less rich in emetia, and contains rarely more than six per cent., while the best rhizomes of true ipecacuanha yield ten and a half per cent. of the pure alkaloid. Dr. Attfield * has recently made some assays of different specimens, and in particular of a variety of *psychotria* which was sent from Bogotá, and which he found to contain only two and a half per cent. of emetia, with great excess of grape sugar. He rightly urges that no more of this latter variety should be imported into Europe.

I have not employed the impure emetia, *émétine brune*, or, as Dr. Attfield terms it, 'saccharoid extract.' Magendie and others worked with this agent, and it is still, I believe, sold as 'emetine.'

* 'Pharm. Journ.' September 1869.



