nothing would do but the old payment of so much per bottle. We have already stated our reasons for wishing that the present system may continue, not for own sake, but for the health and welfare of her Majesty's lieges.

And now we turn to a few observations of what strikes us as at this time especially wanting in the profession. Were we to take up this subject as it ought to be treated, in all its length and breadth, we should write a volume instead of an article; we shall content ourselves with a rapid glance at only a few particulars.

With regard to futurity, the great panacea to be recommended is enlarged preliminary education,—not simply relating to that which is professional,—not simply relating to that which is necessary to constitute the gentleman,—but by a happy combination of the two, to form at once the gentleman, and the medical man;—to teach him to *think*, to *reason*, and to *read*. In order to accomplish these objects, he must make a certain proficiency in mathematical study, and he must be acquainted not merely with the dead, but especially with the living, languages,—above all, with French and German; and these not learned as school-taught,—to translate miserably with the aid of a Dictionary,—but to read and understand thoroughly without adventitious aid. It is absurd to expect man to reason correctly, if he has never been taught the use of reason; it is absurd for him to talk of being acquainted with his profession, if he be not thoroughly imbued with an intimate knowledge of French and German. Nothing more shrivels and contracts the mind into the narrowest selfishness, than the impression that knowledge is to be found only within the circle of its own country.

Second only to this grievous mischief is that want of exertion, and of intellectual expansion, which confines professional reading almost exclusively to the *Journals* of the day. We have the highest possible respect for many of these *Journals*, and we believe them capable of much usefulness, but we also believe them effective of much evil, where they are taken as substitutes for more laborious research; as if the digested food of certain individuals could afford a proper supply of nourishment, if removed into the stomach of another. We look with much jealousy upon all these *Journals* and *Retrospects*, because they form a royal road to knowledge, and are to spare the trouble of research, and take the place of individual study. By means of these fugitive papers, prejudices may be sown, but opinions are not formed; the reasoning powers are never called into exercise, and a reference to a retrospect takes the place of research, and of really deep abiding thought. Tell me not that persons in actual practice have no time for reading; they have time enough if they will make it; what is wanting is inclination. After a weary day, a nap of fifteen or twenty minutes, and a dish of tea, will enable the brain to pursue its studies for hours, and almost every man may obtain time for study, if he will systematically improve it. But if he gossip all the morning,—if he return home to dinner and subsequent siesta of two hours,—and leave work to be done late in the day,—then, indeed, he may not

have time. But this arises from his own thriftless expenditure. We repeat it,—everybody has time for study if he will diligently improve the passing hours, and if he will redeem some portion of that time which is now devoted to little domestic luxuries, and to a larger allowance of sleep than is absolutely required. It may be said that the rule is too stringent, and that the common comforts of life are interfered with. Agreed: so it is; the life of a medical man must be a life of self-denial. But what are these little animal enjoyments when compared with the life and health of the poorest, and the meanest, and the most obscure of the family of man; what are they when contrasted with the unspeakable luxury of ministering to the wants, and weaknesses, and the infirmities of our fellow creatures? Who can estimate the delight which fills and animates the bosom of the medical attendant when he sees his plans succeed, and witnesses the gradual restoration to health and comfort of some valuable life, over which he has watched with intense anxiety. And although, under these circumstances, he may too frequently be assailed by ingratitude,—even then, he can fall back upon the consciousness of his own deservings, instead of that remorseful upbraiding which ought always to rest upon the heart of him who has not done his utmost to enlarge the boundaries of his knowledge, and to perfect the means for its application.

(To be continued.)

ON THE NON-ABSORPTION OF NARCOTIC POISONS BY THE LYMPHATICS.

By E. WELBY DAY, M.R.C.S., Resident Medical Tutor at Queen's College, Birmingham.

Before the discovery of lymphatic vessels, the power of absorbing was attributed solely to the veins; after this discovery solely to the lymphatics. Further investigation showed that absorption is effected through the agency of both systems of vessels, but that lymphatics absorb more slowly than veins, and that some substances are not taken up at all by them.

Thus the extended observations of Tiedemann and Gmelin led these authors to conclude that lymphatic vessels readily take up saline, but reject colouring matters—a conclusion which has been generally accepted by physiologists.

The later researches of Herbst (a) have shown that the absorbing power of the lymphatics is by no means so limited as has been commonly supposed, but that almost all soluble bodies may be conveyed into the system by these vessels. This is proved by careful experiment for alkaline and metallic salts, starch, colouring and odorous matters. There is, however, one class of bodies—those poisons which act on the brain and spinal system, and which are usually included under the term "narcotics," of which it is proved by

(a) Das Lymphgefäßsystem und seine Verhältnisse, Götting, 1854.

the most decisive experiments, that they cannot, under any circumstances, be carried into the system by the lymphatics. The fact has been long observed, but until recently, no sufficient attempt has been made to explain the anomaly.

Emmert (*b*) tied the abdominal aorta of a dog, and into a wound of one foot introduced ferrocyanide of potassium, into a similar wound of the other decoc-tion of nux vomica. The ferrocyanide was absorbed and detected in the urine, but the nux vomica produced no poisonous effects. In another experiment, after tying the abdominal aorta, Emmert introduced prussic acid into a wound of the foot; after the lapse of seventy hours, no poisonous effects having presented themselves, the ligature was loosened, when symptoms of poisoning were observed in half an hour.

These experiments were confirmed by Schnell (*c*) and Schabel (*d*). Ségalas (*e*) after tying the blood-vessels of a loop of intestine, and injecting half a drachm of solution of extract of nux vomica, observed no sign of poisoning after the lapse of an hour.

Opposed to these facts, we have an experiment by the Academy of Medicine, of Philadelphia. After tying the vena portæ, nux vomica was injected into a loop of intestine; tetanus and death ensued in twenty-three minutes. Of this experiment it may be remarked, that it has been repeated by Mr. Blake (*f*) with opposite results, and that admitting the accuracy of the observation, it cannot be allowed that the poison was absorbed by the lacteals, for the communications which exist between the veins of the intestine and those to the vena cava (*g*), enable us to account otherwise for the result (*h*).

The experiments above quoted, together with those to be presently adduced, establish the fact that when the circulation through a part has been interrupted, a narcotic poison introduced does not exert its specific action on the system.

To account for the non-occurrence of poisoning under these circumstances, we are compelled to allow the truth of one of three propositions. 1st. The poison is altered and rendered inert in the lymphatics. 2nd. It cannot enter them. 3rd. Having entered, it cannot be conveyed by them.

The first proposition expresses the views of Emmert, Schnell, Weber, and Müller, but is opposed to facts (*i*). The second supposes such a difference in structure between lymphatics and veins, that by the same

process (endosmosis,) by which fluids enter veins, they cannot permeate the coats of lymphatics—a difference which has not been ascertained. The third proposition states the opinion of Henle, an opinion at which he arrived on hypothetical grounds, but which will be found strongly supported by direct experiment.

Assuming to be true what has been rendered highly probable by physiological observations, that the motion of the lymph is effected through contractions of the lymphatics (*k*), it must be granted that the contractile power of these vessels being destroyed, all motion within them must cease.

On this assumption Henle bases his hypothesis; he conceives that, like other fluids, narcotic poisons are taken up by the lymphatics, according to the general laws of permeation and imbibition, but that the poisons, acting on the coats of these vessels, destroy their irritability, and incapacitate them from conveying their contents (*l*).

This hypothesis appears sufficiently plausible. The topical application of opium to the intestines destroys their peristaltic action. Aconite, infusion of tobacco, and other narcotic poisons, when absorbed from a wound, and carried by the circulation to the heart, paralyse this organ, and render it unable to contract on its contents. Finally, it can be shown that lymphatics, placed under the influence of a narcotic poison, are disabled from conveying into the system not only the poisonous agent, but also inert solutions, which, under normal conditions, they absorb with facility.

The following experiments were undertaken by Dr. Behr, at Henle's request:— (*m*)

Having confirmed the statement of Emmert that, when the circulation through the lower extremities is interrupted, ferrocyanide of potassium is readily absorbed from the one, whilst strychnia applied to the other causes no symptom of poisoning. Dr. Behr proceeded to ascertain the effect of introducing the poison and the salt into the same extremity.

The abdominal aorta was tied below the origin of the renal arteries; into a wound of one of the hinder extremities was then introduced a mixture of 100 drops of solution of strychnia, with 120 drops of solution of ferrocyanide of potassium. After the lapse of two hours and a half, no symptoms of poisoning having appeared, the animal was killed, and the bladder removed. Neither in the urine, on the walls of the bladder, in the peritoneum, in the blood within the

b Diss. inaug. med. de venenatis acidi boruss. in animalia effectibus, Tübingæ, 1805,—Meckel's Archiv. j. p. 176.

c Diss. inaug. sist. historiam veneni Upas Antias. Tübingæ, 1815.

d De effectibus veneni rad. Veratr. alb. et Elebor. Algr. Tübingæ, 1815.

e Majendie's "Journ. de Physiol.," ii. p. 117.

f Edin. Med. and Surg. Journ., vol. lili., p. 45.

g Müller's "Physiology," by Baly, p. 196.

h Kürschner having tied the femoral artery and vein of a frog, and divided the femoral nerve, carefully inserted the

limb into a solution of strychnia. After several hours, symptoms of poisoning were observed.—R. Wagner's "Handwörterbuch der Phys.," i. p. 46.

i In Emmert's experiment above quoted, prussic acid remained seventy hours exposed to the action of the lymphatics, yet was neither absorbed nor rendered inert. Other facts equally strong might be brought against this view.

k See Hewson's Works by the Sydenham Society, pp. 195 and 194. Also note lxi. by Gulliver.

l Allgemeine Anatomie, p. 560.

m Henle und Pfeuffer's "Zeitschrift für rationelle Medizin," Heft j., Band 1, p. 35.

heart, nor in the ureters, could a trace of the ferrocyanide be detected. The thoracic duct was uninjured, and the aorta accurately tied.

In six similar experiments, Behr obtained evidence of the absorption of the ferrocyanide in only two. In one of these it was detected in the ureter, but was absent from the bladder; in the other a trace was found in the urine contained in the bladder. In neither were there symptoms of poisoning.

Behr attributes the absorption of the trace of ferrocyanide found in these two cases to neglect of precautions necessary to ensure that the solutions should not be conveyed into the system by the veins. These experiments appear sufficiently conclusive, and, if confirmed and extended to other poisons of the same class, would have established Henle's hypothesis. They have been repeated by Bischoff, of Giessen, with, however, totally opposite results (*n*).

Of two dogs, Bischoff tied the abdominal aorta, and into a wound of one thigh introduced solution of strychnia; into a similar wound of the opposite limb, solution of ferrocyanide of potassium. The first animal exhibiting no signs of the action of the poison, after an hour and three quarters, was killed. On testing with chloride of iron, the urine gave a dense blue precipitate, (einen starken blauen Neiderschlag.) This observation agrees with those of Emmert and Behr.

The second animal, showing no symptoms of poisoning, after two hours and three quarters, a further quantity of the solution of strychnia was applied to the same wound. In half an hour convulsions arose, which gradually proceeded to tetanus, of which the animal died about an hour and a half from the second application. In this case also the presence of the ferrocyanide in the urine was distinctly shown.

In two other dogs, Bischoff applied a ligature to the aorta, and introduced into the same wound the solutions of ferrocyanide of potassium and strychnia. In one case, after the lapse of an hour and three quarters, no symptoms of poisoning had appeared. In the other, indications of the action of the poison were observed in half an hour, and the animal died of tetanus in an hour and a quarter. In both, ferrocyanide was found in the urine; in the latter case, in the thoracic duct, but not in the blood.

From these experiments Bischoff concludes that, as readily as other soluble matters, narcotic poisons may be taken up and conveyed into the system by the lymphatics, a conclusion which, as we shall have occasion to show, is not altogether warranted.

The importance attached to all questions which relate to the action of poisons on the organism, is sufficiently attested by the attention this subject has received from physiologists. The point attempted to be established

in this paper is invested with additional interest, since it would contribute to throw light on the motive power of the lymphatics, respecting which we possess so little definite knowledge.

The physiological importance of the question at issue, and the conflicting statements of those who had endeavoured to solve it, appearing to call for further researches, I had recourse to the following experiments, in which, under every precaution, I exposed to the absorbing power of lymphatics in the normal condition, and under the influence of a poison, two salts, both known to be readily absorbed by these vessels, and both susceptible of ready recognition in the secretions:—

(*Exp. 1.*) The abdominal aorta of a middle-sized dog was tied below the origin of the renal arteries. Into a wound of the right hind extremity, near the foot, was now introduced ninety drops of a saturated solution of acetate of strychnia, followed by one hundred and twenty drops of a solution of iodide of potassium, (in the proportions of one drachm of iodide to one ounce of water.) Into a similar wound of the opposite limb were introduced one hundred and twenty drops of a solution of ferrocyanide of potassium of the same proportions. After the lapse of two hours and a half, no symptoms of poisoning having appeared, sixty drops of the solution of strychnia were dropped into the wound in the abdomen. In ten minutes convulsions ensued, and the animal died tetanic. The bladder was removed, and the small quantity of urine contained in it received into a test tube. On the addition of a drop of solution of persulphate of iron, there at once appeared a bulky precipitate of Prussian blue, which presented a greenish hue, owing to the deep yellow colour of the urine. The fluid was filtered, the precipitate washed, and to the filtrate was added a few drops of chlorine water, followed by solution of starch. No change became apparent.

(*Exp. 2.*) The abdominal aorta of a dog was tied. To a wound of the right hind foot was applied a mixture of thirty drops of hydrocyanic acid, (containing about 40 per cent. of anhydrous acid,) with one hundred and twenty drops of solution of ferrocyanide of potassium. Into the opposite limb were introduced one hundred and twenty drops of solution of sulphocyanide of potassium, (containing one drachm in one ounce of water.) No sign of the action of the poison having appeared in two hours and a quarter, the animal was killed by introducing into the wound of the abdomen ten drops of the acid. The bladder was removed and the urine received into a test tube containing a few drops of solution of persulphate of iron. It immediately assumed a blood-red tint, but underwent no further change. To the fluid was now added a little sulphuric acid, and after the subsidence of a slight effervescence which ensued, a slip of pure zinc was introduced. In the gas which was evolved sulphuretted hydrogen could be distinctly recognized by the odour, and a slip of lead paper was blackened by it. The fluid had now lost its red colour.

(*Exp. 3.*) A third experiment was conducted in a similar manner. Into the right hind foot was introduced a mixture of one hundred and twenty drops of solution of sulphocyanide of potassium, with forty

* I have made a brief abstract of Bischoff's experiments, from his paper in Henle und Pfeufer's "Zeitschrift für rationelle Medizin," Band iv., Heft j., p. 62.

drops of prussic acid ; into the opposite limb one hundred and twenty drops of solution of ferrocyanide of potassium. After the lapse of an hour and three quarters, the animal having shown no indication of the action of the poison, was killed almost instantaneously by introducing into the wound of the abdomen a few drops of the prussic acid. The urine was received into a tube containing solution of persulphate of iron. A distinct blue deposit left no doubt of the presence of ferrocyanide, whilst the unaltered colour of the supernatant fluid indicated the absence of the sulphocyanide.

These experiments were sufficient to satisfy me of the correctness of the observations of Emmert and Behr. Nor, on examination, do the experiments of Bischoff prove so convincingly opposed in their results as, at first glance, may appear the case.

In Bischoff's first experiment, after an hour and three quarters, sufficient ferrocyanide of potassium had been absorbed to give a *strong* precipitate of Prussian blue when tested for in the urine, yet the strychnia exposed to the same absorbing power gave no evidence of its action on the system.

Again, an objection applies to Bischoff's experiments which does not lie against those of Behr and myself ; the solutions were applied to the upper and inner part of the thigh, where a collateral circulation may be quickly established by anastomosis, and the poison carried into the system by the veins. Several circumstances in the detail of these experiments seem to point to this objection.

Thus, in the second experiment, the application of thirty to forty drops of a strong solution of strychnia produced no effect in two hours and three quarters, by which time the collateral circulation must be pretty well established ; a *second* application of the same quantity *now* brings on symptoms of poisoning in half an hour—exactly the same time, be it observed, in which in the fourth experiment a single application of this quantity of poison brought on tetanus.

From the experiments which have been recorded, we may, I think, justly conclude—1. That strychnia and prussic acid cannot be conveyed into the system by the lymphatics. 2. That the non-absorption of these poisons is due to a specific action exerted by them on the coats of the lymphatics, by which the irritability of these vessels is destroyed, and they are rendered incapable of transmitting their contents.

From the dissimilarity in the operation of strychnia and prussic acid, it may be reasonably inferred, that most other poisons belonging to the same class will, on investigation, be found to conduct themselves in the same manner towards lymphatic vessels.

PERFORATING ULCER OF THE COLON: MECHANICAL OCCLUSION BY HARDENED FÆCES.

TO THE EDITOR OF THE PROVINCIAL MEDICAL AND
SURGICAL JOURNAL.

SIR,

Conceiving that the annexed case offers pathological peculiarities sufficient to merit for it a place in the Journal, I beg to present it for your acceptance and obliging insertion.

I am, Sir,

Your obedient servant,

CHARLES ANDERTON.

Leigh, near Manchester,

May 23, 1848.

I was called to visit Miss H. J. S——, aged 11 years, in September, 1847, labouring under an attack of measles, which, prior to my being called in were well and fully developed, but at this particular juncture a retrocession of the eruption had taken place without any special indications of mischief. After the lapse of a short time evident symptoms of abdominal lesion made their appearance, indicated by strong and almost uncontrollable paroxysms of pain. In addition, we had in this case, the rectum charged to an amazing extent with fecal concretions, resembling masses of calcareous earth, which my enfeebled little patient could not, *per vires naturales*, part with ; they therefore required to be removed manually with a kind of scoop, and this, indeed, required much force. I ought to observe that, when the more hardened portions had been removed, the throwing up of an injection had the effect of encouraging the bowels to relieve themselves, and the motions were invariably of the most massy character, both in point of consistence as well as quantity, notwithstanding the extremely attenuated and wasted state of the child. This condition of matters continued unceasingly, with the abdominal paroxysms increasing in frequency and severity, notwithstanding large doses of opiates, until death, on the 16th instant, happily terminated her earthly sufferings.

The *post-mortem* appearances were as follows:—The body externally wasted to the most extreme degree, with a dry, harsh, and scabrous condition of the entire integuments ; the latter over the abdomen of a dark leaden colour, with considerable distension from flatus ; internally the peritoneum inseparably adherent throughout to the abdominal parietes ; the mesentery uniformly and thickly studded with enlarged glands, and darkened from congestion ; the folds of the intestines had become strongly knitted together by adhesive inflammation throughout their whole course. At the sigmoid flexure of the colon, a *large perforating ulcer*, of the diameter of a shilling, was discovered : this portion of the bowel, with the rectum, was enormously distended with fecal matter, of the character above noticed. Remarkable to relate, the whole superior course of the bowels was devoid of solid matter, but considerably inflated ; the internal lining of the colon was studded with small circular ulcers ; the liver of a