of it, whereby only the perinephric tissue—the fibro-fatty investment of the kidney—is shortened and fastened to the parietes, is useless or at any rate uncertain, and therefore unsatisfactory.

But Hahn,⁹ in the two operation cases which he described, did certainly not aim at the occlusion of the perinephric fascial sac. As I read his account, it appears that, after the kidney had been approached through an oblique lumbar incision, the "capsula adiposa" was pulled backwards into the wound and fastened there with six or eight catgut sutures, and the wound packed with carbolic gauze. It is difficult to see how this proceeding could adequately and permanently diminish the size of the too capacious perinephric capsule, and it is not surprising that it was abandoned.

Nephroexy has been sparingly performed in London hospitals—on an average, ten per annum in each of four large London hospitals (St. Bartholomew's, St. Thomas's, Guy's, St. George's)—because it is looked upon as a serious operation, which for a time makes the patient very ill, which may not cure the symptoms, and which may damage the kidney and weaken the abdominal wall.

Occlusion of the perinephric fascial sac is not a severe operation, does not injure the kidney in the least, and, as the abdominal wall is split and brought together again, it is not likely to be followed by ventral hernia.

I now give some of the results of the few operations which I have done.

Four years ago I performed nephrolithotomy upon a young married woman. Her right kidney, besides having a stone in its pelvis, descended below the level of the umbilicus and slipped about very freely, so that after the abdomen had been entered as far as the peritoneum by splitting the muscles in the flank it was exceedingly difficult to secure. After the removal of the stone the perinephric fascial sac was occluded with three chromic gut sutures. Four years after this operation the right kidney could not be felt, although in the meantime the patient had been leading a rather strenuous life—lawn-tennis being her chief amusement. So, then, occlusion of the perinephric fascial sac suffices to keep the kidney up.

A neurasthenic patient who was operated upon more than a year ago has been seen. The right kidney cannot now be felt. The patient says that she has had great benefit from the operation. "The backache and dragging are gone, and I can now walk about again and ride in trains and buses." In addition to the pain of backache this patient had symptoms pointing to intermittent hydronephrosis. She had had other operations done before, and says she suffered much less from the kidney operation than from any of them.

Another patient with backache, dragging, and symptoms pointing to intermittent hydronephrosis has been entirely freed from these symptoms, but only three months have elapsed since the operation.

A children's nurse, aged 38, was operated upon in April, 1909. I have been unable to see her, but in December, 1913, she wrote: "I am most grateful to be able to write you that I have now no trouble whatever from the kidney which was operated on. I rapidly recovered my strength, went back to my usual work, and have gone on ever since without a rest." Before the operation she had had severe crises with pain, vomiting, and blood in the urine. The presence of a calculus was suspected, but none could be found, although the kidney was explored.

As regards intermittent hydronephrosis, a remark made by Wilson and Howell¹⁰ is to be noted. "The portion of the ureter (about two inches) within the perinephric sheath is free to follow the kidney in all its movements, and thus a kink may be produced at its point of exit from the perinephric sheath," which does not yield. Mr. Alfred Johnson¹¹ has conclusively shown the truth of this.

So occlusion of the perinephric fascial sac in cases of nephroptosis cures the symptoms caused by the dragging upon the renal plexus, the obstruction of the renal veins, and the kinking of the ureter. A kidney which had been loose and prolapsed had, owing to kinking of the ureter, become a thin-walled cyst, distended with urine, and it had to be removed.

Calculi seem rather common in loose and prolapsed kidneys. I have met with this association in 5 cases of nephrolithotomy. It is, however, difficult to know whether the presence of the stone causes the looseness of

the kidney or whether the looseness of the kidney causes the stone. I suspect the latter is usually the case, but clearly it is desirable, after removing a stone from a loose kidney, to complete the operation by occlusion of the perinephric fascial sheath.

There are grounds for suspecting that loose kidneys are more liable to infection, either through the blood stream or by way of the ureter. Clinical histories are not very reliable, but I have removed a tuberculous kidney which had been loose for many years. Ascending colon bacillus pyelonephritis was severe and persistent in the case of a female with nephroptosis on the right side. The left kidney was in normal position, and did not suffer. Such considerations as these suggest a wider field for the treatment of nephroptosis by an operation which seems to be efficacious, is not severe, and does not endanger the kidney.

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- ² Mr. Raymond Johnson, *Lancet*, January 24th, 1914, p. 245. ³ *Loc. cit.*, p. 130. ⁴ *Loc. cit.*, p. 139. ⁵ *Movable Kidney*, London, 1908, p. 12 et seq.
- ⁶ *Loc. cit.*, p. 12. ⁷ See also Morris, *Surgical Diseases of the Kidney and Ureter*, vol. i, p. 4 et seq., Figs. 2 and 3. ⁸ *Loc. cit.*, vol. ii, p. 221.
- ⁹ *Centralbl. für Chir.*, 1881, No 29, p. 450. ¹⁰ *Loc. cit.*, p. 13. ¹¹ *Proc. Roy. Soc. Med.*, vol. vii, No. 4, p. 150.

THE USE OF AN APERIENT BEFORE X-RAY EXAMINATION OF THE INTESTINE IN CHRONIC CONSTIPATION.

BY

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It does not appear to be certainly known to radiographers whether or not the presence of faecal accumulations in the last portions of the large gut influences the rate of passage of the mixture of bismuth and food in any constant manner.

If there be such an influence, it would seem that the gut should always be emptied by an aperient before an x-ray examination is made, in order to obtain comparable results in different cases. Some writers advise an aperient, whilst others do not mention it. Search in those books and journals to which we have had access has not afforded any definite evidence on the point; as it seems to be of some moment we have, therefore, at the suggestion of Dr. Spriggs, endeavoured to investigate it.

Four adult men, who had all suffered for many years from chronic constipation, for which there did not appear to be any cause in the nature of mechanical obstruction, were observed, the same procedure being employed in all.

Two series of photographs were taken in each case; the first series was not preceded by an aperient; in the second the bowel was emptied by a dose of castor oil on the night before the bismuth meals. Observations were made immediately at 4, 6, 12, 24, 36, and 48 hours after the bismuth breakfast, and at other times when necessary.

The following is a summary of the findings in the 4 cases:

1. The first case was one of delay in the stomach and colon. In the first series of skiagrams, before which no purgative was taken, the stomach emptied in about nine hours, and the transverse colon, which was reached in seven hours, not till 100 hours.

In the second series (after castor oil) the stomach emptied about one hour earlier, but the delay in the colon was not appreciably affected.

2. The second case was one of spastic constipation of the descending colon, the passage through the stomach and small intestine being normal. The stomach was emptied in four and a half hours and the caecum reached in four hours. The stasis in the large bowel was especially marked in the caecum.

On comparing the two series of skiagrams, it was found that the bismuth passed rather more rapidly in the first series than in the second one (after castor oil).

3. In the third case also the delay was in the large intestine, but here we found that the second series (after castor oil) showed a slightly more rapid passage of the bismuth.

4. The fourth case was one of moderate delay in the caecum, but the total time which the bismuth took to traverse the entire bowel was not abnormally long; the caecum was not quite emptied in thirty hours, while the bismuth had entirely left the rectum in forty-eight hours.

In this instance there was practically no difference to be noted between the two series of skiagrams.

Conclusion.

So far as the evidence in these cases goes, the conclusion may be drawn that, in cases of chronic constipation, the variations between the rates of passage of the bismuth along the intestine were but small, whether the bowel had been emptied by a preliminary aperient or not; at the most the differences were not greater than can be said to be within the normal limits.

Further, where differences were noted in the two series, they were not constant, being in one case in the direction of greater rapidity after an aperient, in another of less, and in a third varying at different times in the same patient.

It is, however, undoubtedly wise in most cases to give a purge before making an x-ray examination, on account, first, of the greater clearness of the skiagrams obtained when the intestine is empty; and secondly, of the discomfort which the patient, deprived of his usual aids to defaecation, may experience in the two or three days occupied by the x-ray observations, during which, of course, no aperient must be given.

The result of these trials appears to show, nevertheless, that in cases in which time does not permit of a preliminary purge, or in which it is undesirable for any other reason to give it, the conclusions reached may be accepted without the fear that they have been materially vitiated by the omission.

INSECTS AND WAR:

III.—FLEAS.

By A. E. SHIPLEY, Sc.D., F.R.S.,
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Marke but this flea, and marke in this,
How little that which deny'st me is;
It sucked me first, and now sucks thee,
And in this flea our two bloods mingled bee.

Dr. DONNE.

THE fact, now fully established, that the bubonic plague is conveyed to man from infected rats or from infected men by fleas has taken that wingless insect out of the category of those animals which it is indelicate to discuss.

No doubt, as Mr. Dombey says, "Nature is on the whole a very respectable institution"; but there were times when she presented herself in a form not to be talked about, and until a few years ago the flea was such a form. Hence few but specialists have any clear idea either of the structure or of the life-history or of the habits—save one—of the flea.

Fleas are temporarily parasitic on many mammals and birds, but some mammals and some birds are much freer

Fig. 1.—*Pulex irritans*, female. The legs of the left side only are shown. (After a drawing by A. Dampf.) Enlarged.

from fleas than others. As the flea is only on its host for part of the time, it has to put in the rest of its existence in some other place, and this in the case of the human flea is usually the floor, and in the case of bird-fleas the nest; from these habitats they can easily regain their hosts when they retire to rest. But large numbers of ruminants—deer, cattle, antelopes, goats, wild boars—sleep in different places each night, and to this is probably due the fact that, with the exception of two rare species, one taken in Northern China and the other in Transcaucasia, the ruminants have furnished descriptive science with no fleas. Both of

these ruminant fleas are allied to the burrowing fleas or "chigoes."

I know I shall not be believed when I say that the same is true of monkeys, but I do this on the undoubted authority of Mr. Harold Russell, who has recently published a charming little monograph on these lively little creatures. Monkeys in nature are cleanly in their habits, and although in confinement occasionally a human flea attacks them, and although occasionally a chigo bores into the toes of a gorilla or chimpanzee, "speaking generally, it may be said that no fleas have been found truly parasitic on monkeys." Whatever the monkeys are looking for, it is not fleas. What they seek and find is in effect little scabs of scurf, which are made palatable to their taste by a certain sour sweat.

As a rule, each host has its own species; but though for the most part *Pulex irritans* is confined to man, it is occasionally found on cats and dogs, whilst conversely the cat and dog fleas (*Ctenocephalus felis* and *Ct. canis*) may attack man. The bite of the flea is accompanied by the injection of the secretions of the so-called salivary glands of the insect, and this secretion retards the coagulation of the victim's blood and stimulates irritation.

It is only a few years ago that the spread of plague was associated first with rats, and then with rat-fleas; and it became at once of enormous importance to know which of the very numerous species of rat-flea would attack human beings. The Hon. Charles Rothschild, who has accumulated a most splendid collection of preserved fleas in the museum at Tring, had some years ago differentiated from an undifferentiated assemblage of fleas a species first collected in Egypt, but now known to be the commonest rat-flea in all tropical and subtropical countries. This species (*Xenopsylla cheopis*)—and to a lesser extent *Ceratophyllus fasciatus*—unfortunately readily bites man, and if they should last have fed upon a plague-infected rat, their bites will communicate bubonic plague to human beings. Plague—the old English "Black Death"—is a very real peril in armies operating in Asia and in certain parts of Africa.

Just as some fleas attack one species of mammal or bird and avoid closely allied species, so the human flea has its favourites and its aversions. There is a Turkish proverb which says "An Englishman will burn a bed to catch a flea," and those who suffer severely from flea-bites would certainly do so; but there are persons even a flea will not bite. Mr. Russell has reminded us in his Preface of the distinguished French lady who remarked, "Quant à moi ce n'est pas la morsure, c'est la promenade!"

There are one or two structural features in a flea which are peculiar, the most remarkable being that, unlike other insects, it is much taller than it is broad. As a rule insects, such as a cockroach, the bed-bug, or a stag-beetle, are like skates—broader than they are thick; but the flea has a laterally compressed shape, like a mackerel or herring. Then the three segments or rings which come after the head are not fused into a solid cuirass as they are in the fly or the bee, but are movable one on the other. It is usual in insects for the first joint of the leg to be pressed up against and fused with the segments of the body that bear them, but in the flea not only is this joint quite free, but the body-segment gives off a projection which stretches out to bear the leg. Thus the legs seem, unless carefully studied, to have an extra joint and to be of unusual length. They certainly possess unusual powers of jumping. As Gascoigne, a sixteenth century poet (1540–78), writes, "The hungry fleas which frisk so fresh." The male, as is so often the case amongst the invertebrata, is much smaller than the female. The latter lays at a time from one to five minute, sticky, white eggs, one-fortieth of an inch long by one-sixtieth broad. They are not laid on the host, but in crevices

Fig. 2.—Larva of *Pulex irritans*. Cf. frontal horn; d. antenna. Enlarged.