3. That all doubtful cases should be submitted to exploratory operation, unless the body weight rises under medical treatment.

4. That even exploratory operations often leave the diagnosis doubtful. In such circumstances the case should be seen at frequent intervals or else treated by excision.

5. Mortality after resection of cancer of the stomach is about 50 per cent. This is caused by peritonitis, shock, and lung complications.

6. The immediate mortality can be greatly reduced by adopting the two-stage method.

7. That mortality can be further much reduced by excluding cases where the colon, pancreas, or posterior lymph glands are seriously involved.

8. That the adequate removal of the associated lymph areas demands that the great omentum and the tissues in front of the pancreas should be taken away.

9. This can be done by the above-described operation.

10. Remote results of radical operations only give a percentage of 7.6 three-year recoveries of those operated upon. This low figure may in part be due to the inadequate removal of lymphatic tissues.

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FOREIGN BODIES IN THE DUODENUM.

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THE rarity of the impaction of foreign bodies in the duodenum makes it desirable that every case of this accident should be recorded.

History.

A girl, aged 3 years, was admitted into the Belgrave Hospital for Children on August 19th, 1909. Two days before admission the child, who had been very healthy previously, told her mother that she had swallowed a short piece of pencil with a metal extremity, such as is usually attached to a dance programme. The next day she began to suffer from sickness, diarrhoea, and colicky pain. As this continued, she was brought to the hospital, and admitted on the third day after the accident.

When put to bed the child appeared to be in no pain. The

abdomen was not distended, and moved well with respiration. Slight tenderness was present to the right of the umbilicus. The diarrhoea soon ceased. When the child was examined by x rays on the day following admission a well-marked shadow, evidently the metal end of the pencil, was seen about 1½ in. from the middle line beneath the right costal margin. With the child lying on her back and the x-ray tube beneath her, the dark area appeared to descend fully an inch on deep inspiration. Every day the child was examined with x rays, but neither constipating food nor purges made any difference to the position of the shadow.

Operation: Recovery.

On September 1st, twelve days after admission, I decided to operate. An incision, 3½ in. long, was made above the umbilicus in the middle line. On introducing the hand into the abdomen the pencil was at once felt impacted across the gut just at the bend between the descending and transverse parts of the duodenum. It was easily disimpacted and pushed back into the stomach. An attempt was next made to pass a Brünig's foreign body forceps into the stomach, with which, aided by the hand in the laparotomy wound, it was hoped to seize the foreign body, and remove it by the oesophagus. Unfortunately, having no oesophagus tube with me, I was unable to pass the forceps down to the stomach, owing to their points catching in the mucous membrane of the gullet. The attempt was accordingly abandoned. A small incision was made through the anterior wall of the stomach on to the foreign body held between the fingers. The pencil at once shot out, and the small wound was closed by a double row of stitches. Through-and-through sutures closed the abdominal incision.

The wound healed in a satisfactory manner, and the child left the hospital on October 7th.

The pencil was found to be 1½ in. long and ⅜ in. in diameter. The point was not at all sharp.

When the fate of the various foreign bodies that are swallowed is considered, the rarity with which they give rise to any serious trouble during their passage through the alimentary canal must appear striking. Innumerable cases are recorded, both in children and in adults, in which the most varied assortment of miscellaneous articles have been successfully passed by the rectum. Thus Norton¹ describes a case in which a pin 3½ in. long passed through the alimentary canal of a child aged 13 months in twenty-one hours, and Petit de la Villéon² another in which a pin 2 in. long, with a large head and sharp point, was passed by the rectum fifteen hours after it had been swallowed. A third example in which a child of 3 successfully disposed of a pin 3 in. in length is recorded by Silver.³ Goodall⁴ mentions a case in which a pocket-knife nearly 3 in. long traversed the alimentary canal of a child of 2 years in four days. Numerous examples of safety pins having been swallowed by infants without any harm resulting are to be found in the literature, and Holt⁵ mentions a case in which an infant of 6 months managed to dispose of a mouthful of seven such pins, some open and some closed, without any evil consequences. Davis-Colley⁶ describes how a needle 5 in. long only gave rise to trouble when the descending colon was reached, and Mansell Moullin⁷ a case in which 4½ in. of hatpin travelled as far as the ileo-caecal valve in a girl of 19 before it became impacted.

Some interesting observations on the way in which the intestines deal with pointed foreign bodies are referred to by Ross⁸; he mentions the experiments of Müller and Exner, who have shown that in dogs the contact of any sharp pointed body with the mucous membrane of the bowel results in a corrugation of the intestinal wall, which tends to push away the offending body. This action is purely reflex, and occurs just as well after the nerves going to the segment of bowel under observation have been divided. Evidence of a similar action in man is seen in a case described by Kretz,⁹ in which a chicken bone perforated the bowel, and numerous scars were seen in the mucous membrane proximal to the point of perforation.

But foreign bodies do occasionally become impacted even in the duodenum, though relatively few cases seem to have been described. Clement Lucas¹⁰ relates a successful case which closely resembles the one here recorded. A child of 22 months swallowed a French nail 2 in. long, which was seen by the x rays in the situation of the second part of the duodenum. When it had remained in the same position for nearly a month Mr. Lucas decided to operate. He opened the abdomen, seized the nail through the duodenal wall, and cutting on to it, removed it. Laurence Jones¹¹ records a case under the care of Mr. Crisp English, in which a girl swallowed 2½ in. of a broken bodkin. For the first few days it appears to have remained in the stomach, but later on it passed through the pylorus, and twelve days after being swallowed the

sharp broken end pierced the second part of the duodenum and gave rise to acute symptoms. Lihotzky¹² mentions a most curious case, in which a spoon remained harmlessly in the stomach and duodenum for two and a half years, and only gave rise to perforation of the latter when the anatomical relations of the viscera became disturbed by the occurrence of pregnancy. Last of all, we have Chaput's¹³ case in which a tooth plate was swallowed and became impacted in the third part of the duodenum, its onward progress being blocked by the pressure exerted on the gut by the superior mesenteric vessels and the ligament of Treitz. After ten days an attempt was made to remove the foreign body through an opening in the commencement of the jejunum. But the tooth-plate was firmly fixed in the bowel by its metal points, which had deeply penetrated the wall, and not until the incision was prolonged upward to the duodenum could it be removed. Although some difficulty was experienced in suturing the bowel the patient did well.

It seems not a little curious that elongated foreign bodies do not more frequently become impacted in a bent tube like the duodenum. The screen examination in the case here recorded seems to indicate that the duodenum of children is more movable than might be imagined, and it is probable that this part of the bowel is capable of considerable dilatation. Again, the observations of Müller and Exner serve to show that a curved and pointed body will be rotated by the bowel into such a position that it will pass most easily. In this way, perhaps, may be explained the numerous cases in which, especially in children, a foreign body of considerable length has passed through the duodenum without giving rise to trouble.

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THE EXISTENCE OF LIVING CREATURES IN THE STOMACH AS A CAUSE OF CHRONIC DYSPEPSIA.

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THE frequent occurrence of entozoa in the human subject is probably responsible for the superstitions current through many centuries regarding the occasional harbourage in the stomach of various strange animals, which, subsisting upon the food of their host, or even upon the structures of the viscera, gave rise to a series of weird symptoms that usually terminated in an agonizing death. Such stories have not only obtained credence among all classes of the population throughout the entire world, but have frequently been recorded and commented upon by members of the medical profession, many of whom appear to have been genuinely convinced that the animals shown to them had actually escaped from the body. So many of these fables were obviously the outcome of gross superstition, hysteria, or of a deliberate intention to defraud, that it is, perhaps, hardly surprising that modern writers on diseases of the digestive system either ignore the subject altogether or only briefly mention accidental parasitism. Nevertheless, instances are still recorded from time to time in medical journals in which some unusual inhabitant of the human body has been observed by credible witnesses. With some little trouble more than 180 cases may be collected in which lizards, salamanders, frogs, slugs, caterpillars, worms, leeches, beetles, larvae, chrysalides, or maggots, were believed to have been harboured in the digestive tract for a considerable time and accompanied by an intractable form of dyspepsia. Some of these are so well authenticated that the subject certainly merits more attention than has hitherto been accorded to it.

INSECTS.

A large number of different insects or their larvae have been observed as accidental inhabitants of the human

body, and in the early part of last century Hope published a list of some forty-three varieties which had been identified. Since that time numerous other cases have been recorded, and there is now little difficulty in collecting a hundred and thirty examples of myiasis or diseases caused by the presence of insects. In the vast majority, where sufficient details are given to permit of their identification, the insects belonged to three of the fifteen natural orders—the Diptera or two-winged flies, the Coleoptera or beetles, or the Lepidoptera, or butterflies and moths—and it is with the various species belonging to these three orders that the following remarks are chiefly concerned.

1. *Diptera*.

Of the numerous families of this order, the Muscidae, which include the house-flies, blow-flies, flesh-flies, and flower-flies, contribute the greatest number of parasitic larvae. The eggs of these insects are usually deposited in places where an abundance of food is obtainable without the necessity of exertion, and consequently the resultant larvae constitute the lowest form of maggots, and possess no legs. A very short time may intervene between the deposition of the egg and the appearance of the larva. In the case of the blow-fly it does not exceed twenty-four hours. As a rule, the common house-fly (*Musca domestica*) lays her eggs upon various forms of cooked meats, sweets, or biscuits, while the bluebottle or blow-fly (*Musca vomitoria*) prefers high meat, game, or other kinds of animal food that are undergoing decomposition. In his description of the latter species, Wood remarks that the oval wire covers which are sold for the purpose of keeping blow-flies from meat are often useless, since, when the insect finds that she cannot gain direct access to the meat, she will rest on the top of the cover, and allow her eggs to drop through the meshes or the wire gauze. The flesh fly (*Musca carnaria*) proceeds in a different and more expeditious manner. In the case of the bluebottle and most other Muscidae the eggs have to be hatched after their deposition, but in this species they are hatched within the body of the parent and are deposited as maggots, each female producing about twenty thousand. It was to such insects that Linnaeus referred when he wrote the apparent paradox that three flies could eat an ox as fast as a lion. The flesh fly does not even wait until the meat has undergone incipient decomposition, or, perhaps, is able to detect signs of it before they become apparent to the human senses, since hosts of these minute larvae are often found upon birds and animals within two hours of their death.

Of the genus *Anthomyia* some species, such as the meat-fly (*Musca anthomyia*) particularly affect meat, while others feed on radishes, onions (*A. ceparum*), lettuces (*A. lactucae*), or cabbages (*A. brassicae*). Others, again, deposit their eggs in certain fruits, especially the raspberry and blackberry, each specimen of which when fully ripe may be found to contain a maggot. The number of eggs and larvae which are ingested by persons who devour garden and hedgerow fruit must be enormous.

In two apparently authentic cases (Lasalle, Sentex) larvae belonging to the family of Tipulidae or crane-flies were detected in the vomit and faeces. Of this, the best-known species is the *Tipula longicornis*, or daddy-long-legs, which deposits its eggs on the ground, whence they possibly gain access to the human stomach by means of unwashed vegetables and fruit. The grubs, which are tough-skinned and hard-headed, are well known to gardeners by the name of leather jackets. The larvae of other species live in rain or well water, in which they may often be detected as minute thread-like worms of scarlet colour that exhibit constant twisting movements. Occasionally the larvae of the drone-fly (*Eristalis tenax*) find their way into the stomach through the medium of water, although the muddy fluid favoured by these rat-tailed maggots can hardly be described as suitable for drinking purposes.

Drosophila larvae are sometimes ingested in sour milk (Hutton), and the well-known cheese mites (*Piophilae casei*), which are probably quite harmless, need no description. Another dipterous insect that lays its eggs upon the surface of the water is the common gnat (*Culex pipiens*), and Allonreau has related an instance in which immense numbers of the eggs and larvae of gnats were vomited at intervals. The family of the Oestriidae or bot-flies are parasitic in certain animals, the larvae of the