GASTRO INTESTINAL DISEASES.

The large work by Dr. BOARDMAN REED of Philadelphia on *Diseases of the Stomach and Intestines*¹ hardly needs a correspondingly long notice, for, although the volume, including the index, extends to over a thousand pages, it has been made up largely from standard authorities whose books are well known in this country.

The drawings are chiefly borrowed from the works of Sidney Martin and Ewald, or from the catalogues of instrument makers, and in the few cases in which they are original little can be said in their favour—for example, the microphotographs on pp. 508-9, 527, and the drawings on pages 613 and 939.

Much of its bulk is also due to the inclusion of matter which is usually treated briefly in a work of this kind or left out altogether. For example, sixty-five pages are devoted to anatomical and physiological details, while chapters are given on diseases of the rectum and anus, with their surgical treatment; the animal parasites of the intestine, including tape-worms, and acute infectious diseases, such as diarrhoea and dysentery. We might congratulate the reader on being spared cholera and enteric fever.

The description the author gives of his method of examination is most elaborate, a whole lecture being devoted to the interrogation of the patient. Most readers will agree that the suggestions he makes on pp. 71-2 as to sexual matters are not required in the examination of the stomach in this country. The author quotes (page 83) a Dr. John P. Arnold for a novel objective sign:

The peculiarity described by him is in such cases a somewhat doughy and in chronic cases a gristly, tense, cord like feeling of the band of longitudinal muscular fibres which run (*sic*) up and down on either side of the spine. This abnormality is supposed by Arnold to be due to a congested or infiltrated condition of the muscle, while the cord itself is anaemic probably in chronic cases. Hammond believed the spinal cord to be anaemic in such cases. The findings obtained by a careful palpation over the spine should thus assist in directing our attention to the organ or part of the body which may be suspected of being diseased.

Lower down we are told that:

If there is sensitiveness to pressure near the lower dorsal vertebrae you should suspect some disease of the stomach or possibly in the small intestines, but it might signify disease in the liver or pancreas either alone or in conjunction with an involvement of the stomach and small intestines, since the vaso-constrictors which supply all of these organs are found in the same spinal nerves from the fifth dorsal to the second lumbar.

So that, after all, the precise indication is not very clear.

The author is not clear as to the value of stomach washing, but it is evident that he is not such an ardent advocate of it as some of his German trained fellow-countrymen were a few years ago. It is singular how seldom it is really needed, and probably the cases in which it has proved in the past of most value are those which may be best cured by gastro enterostomy. The style of Dr. Reed's therapeutics is shown by his preference for the administration of "cuprum arsenite" in doses of from $\frac{1}{100}$ to $\frac{1}{1000}$ of a grain!

On more important questions we find him wanting. The diagnostic signs of dilatation are not clearly described, nor the differential diagnosis of atonic and obstructive dilatation made plain, while undue reliance is placed upon the uncertain sign of splashing. Surgical methods are not discussed, although there is a special chapter on the surgery of the stomach and intestines at the end of the book which in a very inadequate manner mentions the principal operations now undertaken for the relief of stomach conditions.

Possibly Dr. Reed does not claim to be an authority upon pathology, at any rate his illustrations of pathological conditions are generally borrowed, and his descriptions under this head are meagre. The remarks on treatment are perhaps the parts of the book for which he would chiefly claim credit; they are certainly varied, including such brilliant suggestions as the treatment of tuberculous ulcer of the stomach by the injection of Koch's tuberculin, and cancer of the stomach by x rays and radium; he delights in mechanical appliances, but he nowhere shows an intelligent appreciation of the indications for surgical treatment.

It is scarcely worth while to pursue this course of criticism through the second part of the book, which is devoted to diseases of the intestines, but we may note the absence of any reference to the value of blood counting in the diagnosis of appendicular abscess, and an extraordinary claim of the author's to treat Bright's disease successfully by "secondary static currents"!

¹ *Lectures on Diseases of the Stomach and Intestines, for Practitioners and Students.* By Boardman Reed, M.D. Bristol: John Wright and Co.; and London: Simpkin, Marshall, Hamilton, Kent, and Co. 1905. (Demy 8vo, pp. 1021, 112 illustrations. 21s.)

PLAGUE AND THE GEOGRAPHICAL DISTRIBUTION OF RATS.

By BRUCE SKINNER,
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CERTAIN facts connected with the geographical distribution of rats appear to me to be of interest in relation to the distribution of plague, and I write in the hope that some of your readers may, even if they disagree with the suggestions offered, throw some light on the points dealt with below.

Although the history of plague epidemics is familiar to most, it will perhaps be advisable to first sketch the leading points in order that their relation to the distribution of a species of rat may be made more graphic.

The following localities have been marked off as "endemic areas" of plague.¹

1. The district of Assy in Arabia, on the eastern shore of the Red Sea;
2. Parts of Mesopotamia and Persia;
3. The district of Garhwhal and Kumaon, in the North-West Provinces of India;
4. Yunnan in China;
5. East and Central Africa.

In former times the ravages of plague in Europe were devastating in their effects. Towards the close of the seventeenth century the epidemics on this continent gradually ceased, the cessation occurring first on the western side and working eastwards, the following being the dates of the last epidemics in the countries named:

Netherlands, 1672.	France, 1722.
England, 1679.	Sicily, 1743.
Spain, 1681.	North Russia, 1770.
Scandinavia, 1704.	Hungary and Poland, 1771.
Germany, 1707.	Italy, 1815.
Denmark, 1710.	Turkey, 1841.
Austria, 1713.	

Plague lingered on in South Russia till 1837, recurring on the banks of the Volga in 1879.

From the endemic area plague again gathered way in 1896, and epidemics have since assumed formidable dimensions in China and India, extending to Japan and Formosa, the Sandwich Islands, New Caledonia, Australia, South Africa, Madagascar, Mauritius, Réunion, Egypt, Arabia, Mesopotamia, Persia, European Russia, East and West Africa, Portugal, Glasgow, Vienna, Turkey, Mexico, California, Paraguay, Argentina, Brazil.

It has been chiefly in India and China that rats have been observed to be infected with plague, while this was not found to be the case in the epidemics of the later period occurring in Glasgow and Oporto.

The distribution of rats, as far as I have been able to ascertain, is as follows:

The old English rat (*Mus rattus*), which I will here call the long-tailed rat, is stated to have appeared in Europe in the thirteenth century. It is world-wide in its distribution. This rat may be black, brown, rufous, and even grey in colour. No reliance can, however, be attached to the coloration of rats for specific distinction.

The other species, the brown rat (*Mus decumanus*), is commonly known as the Norway rat—perhaps owing to its having been introduced into England in Norwegian vessels. According to Pallas, who is referred to on this point by both Murray² and Lydsker,³ the Norway rat came from Asia, crossing the Volga in 1726 after an earthquake. It was recorded in England in 1730 and in France in 1737. The dates probably indicate the period when this rat was present in such numbers as to have become the subject of notice.

In 1775 it appeared in North America, and subsequently in California, Jamaica, Brazil, and at Maldonado on the La Plata. Murray says it does not occur in New Zealand, though Darwin recorded it there.⁴ It is not found in Persia and Kandahar (1866). It is known in India, chiefly in the ports. It is unknown in Siberia.

The Norway rat has opportunities of spreading in ships; perhaps it is for this reason that popular natural histories record its distribution as world-wide. But before accepting this inference it would be more satisfactory to have records of its capture in countries distant from Europe, certified by the diagnosis of the species by a competent naturalist. For it has to be borne in mind that the colouring of the long-tailed rat is sometimes much like that of the Norway rat. So much

¹ Shadwell, Dr. A., *Encyclopaedia Britannica*, vol. xxxi, p. 788.

² *Geographical Distribution of Mammals*, 1866.

³ *Royal Natural History*, p. 140.

⁴ *Voyage of the Beagle*, 1896 Ed., p. 512.

alike are they, that the Egyptian rat (*M. alexandrinus*) has been mistaken for the last named. This Egyptian brown variety of *M. rattus* extends from North Africa through India to Burmah.

The Norway rat is larger than the long-tailed, and excels it in strength and ferocity. These characters have enabled it to drive the long-tailed rat into an extremely subordinate position in Europe. The Norway rat is usually light brown in colour, and possesses two distinguishing characters—its tail is never longer than its body, and its ears when bent over do not reach further than the margin of the eye. It keeps to the lower parts of buildings,⁵ while the long-tailed rat is inclined to ascend to higher regions, and has been known to nest in trees.

It will be obvious, if the Norway rat did not appear in England until 1730, that it had nothing to do with the plague there. It did not appear in France or the Netherlands until after the last plague epidemics in those countries. In fact, the only countries in which it may have been present before the Eastward retrocession are Hungary, Poland, and Russia, presuming Pallas's statement to have been correct.

Mr. Oldfield Thomas, F.R.S., informs me that the ship rat belongs to the long-tailed species. The Norway rat is stated to go on board ships in harbour, but to leave them when they are sailing; he is consequently not found in numbers on ships at sea, where he is present more by accident than design. Dr. Shadwell⁶ records that plague-stricken rats have rarely been found on board ships, even though such ships may have been in communication with infected ports. Though plague has evidently been carried to many ports by ships, it has made practically no headway, and in some cases the rats of the ports where plague has been imported have not suffered. For instance, the rats of Oporto (1899) and Glasgow (1900) were not infected during the epidemics at those ports.

The above points appear to me to suggest that the Norway rat may possibly be immune, wholly or partially, to plague, and, further, that he may be the means of keeping down at least one of the causes of dissemination through his successful antagonism to the long-tailed rat. The latter has been almost driven out of places where the Norway rat has gained a footing—certainly in Europe. The Egyptian variety appears to be holding its own, but probably, if encouraged by man, the Norway rat would gain the mastery in places where he is not yet dominant, if repeated reinforcements from the parent stock were imported into such countries until the species was established.

I have ventured to communicate these notes in the hope that some may perhaps think it worth while in the cause of knowledge to work out two points:

1. The presence of *Mus decumanus* within the endemic areas of plague, and whether in large numbers or only occasionally. He was not present in Persia or Kandahar when Murray wrote (1866). It would be a gain to know if he is established in Garhwhal and Kumaon, Yunnan, and East and Central Africa, as the dominant species. The *M. humilatus* of China is said to be almost identical with *M. decumanus*: is it found in Yunnan?

2. The liability, or otherwise, of *M. decumanus* to plague infection.

This last point can, of course, be investigated without proceeding to a plague area, but apart from laboratory experiments, it would be interesting to know if this Norway rat suffers from plague in an infected area—say, in Bombay. I think the history of the invasion of Europe by this species points to the possibility that he does not.

It at least indicates certainly that he was not the propagator of the historical epidemics, and it points to the probability that by his destruction of the long-tailed species he has been instrumental in saving Europe from the establishment and spread of epidemics carried to our ports by man as well as by rats. It is of course possible that he keeps down sickness in his tribe by his custom of prompt destruction and assimilation of ailing members, thus maintaining a high standard of vitality, the surest guarantee of immunity, in his race.

At least there would appear to be a *prima facie* case for further investigation on the above lines to elucidate the problem whether the Norway rat prevents the spread of plague

by destroying the long-tailed rat varieties who undoubtedly appear to be propagators of the disease, and whose indigenous area corresponds with the endemic areas of plague.

I may mention that the Americans have been enabled to grow fruit on trees that were formerly rendered worthless by a scale insect, by importing and breeding the Chinese variety of the ladybird which feeds on this insect. The case is not on all fours with the above problem, but it is valuable as illustrating how one variety of animal may be useful in dealing with a disease which continues unchecked in the presence of other varieties of the same animal.

I have suggested that the Norway rat may stay the spread of plague by destroying the long-tailed species; it is of course possible that the Norway rat may have a more direct method of dealing with the disease at its source⁷—wherever that may be.

UNDERFED CHILDREN AT PUBLIC ELEMENTARY SCHOOLS.

THE Local Government Board has issued an Order to Boards of Guardians as to the relief of underfed elementary school children, authorizing the provision of such relief under certain conditions. The Order does not apply to a child who is blind or deaf and dumb.

In a covering circular the Board states that the question has been raised as to the powers and duties of guardians in relation to such children, and the circular proceeds as follows:

Powers and Duties of Guardians.

The guardians and their officers are, of course, only concerned with the relief of destitution, but if a child in any Poor-law union is in fact destitute of necessary food, and application for relief is made to the guardians or the relieving officer by the child or by any responsible person on his behalf, it is the duty of the guardians, and, in a case of sudden or urgent necessity, of the relieving officer, to afford such relief as may be requisite, subject to the regulations issued by the Board or their predecessors with regard to the administration of relief which are in force in the union. And this is so, even although the parent is able to provide the food required, if in fact he fails to provide it.

The Board realize, however, that where the child resides with a parent who is able to supply the requisite food but neglects to do so, the cost of the relief given ought in general, and especially where the neglect is habitual, to be borne by the parent and not to fall on the ratepayers. The object would be secured if the relief was given on loan, and the cost was recovered from the parent. This could not be done in all cases, but in order to meet the object in view as far as possible, the Board have issued a new order called "The Relief (School Children) Order, 1905," dealing with relief to children in public elementary schools. Copies of the Order are enclosed, and for convenience of reference it is also printed as an appendix to this circular.

Effect of Order.

The Order deals with cases where an application is made to the guardians directly or otherwise, or to a relieving officer, by the managers, or by a teacher duly empowered by the managers, of a public elementary school, or by an officer duly empowered by the local education authority, having for its object the allowance of relief to a child under the age of 16, who is in course of attendance at a public elementary school. Such an application is defined as a "special application" by Article I of the Order, but, as will be seen from Article VII, the Order only deals with a special application made where a child to whom it relates is not blind, or deaf and dumb, and resides with his father, and his father is not in receipt of relief other than relief given in accordance with the Order.

Where a special application is made to the guardians, and the case is not one of sudden and urgent necessity, Article II of the Order requires them to take steps to ascertain whether relief to the child is or is not rendered necessary by the habitual neglect of the father to provide adequate food for the child. If the guardians are satisfied that it is, then any relief or the cost price of it given in accordance with the Order must be given or considered as given by way of loan. If, however, the guardians are not satisfied that the relief is rendered necessary by the habitual neglect of the father to provide adequate food, it will be in their discretion to determine whether or not the relief shall be given on loan. In any

⁵ Duncan, *Cassell's Natural History*, p. 108.

⁶ Op. cit.

⁷ Cases where plague-stricken rats have been found on ships are recorded in the Local Government Board Report on Bubonic Plague, 1902, by Dr. Bruce Low, p. 18.

⁸ See, as bearing on this, Dr. J. Danysz on A Microbe Pathogenic to Rats (*Mus decumanus* and *Mus Rattus*), etc., in the BRITISH MEDICAL JOURNAL for April 2, rd, 1904, p. 947.