frailer part below; but this aperture had all the appearance of having been squeezed by the adjacent intussusceptum into a mere slit, which had been nearly and eventually quite impassable. A longitudinal incision through the intussusceptum showed it to be a simple pouch of bowel turned inside out, bounded peripherally by mucous membrane and centrally by peritoneum; thus differing essentially from the ordinary form of intussusceptum, composed of two cylinders of bowel in juxtaposition, bounded both peripherally and centrally by mucous membrane, with a double layer of peritoneum between them.

NOTES ON APENTA AND SOME OTHER BITTER WATERS.

By JULIUS ALTHAUS, M.D.,

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THE individual differences which are found to exist in the chemical composition of mineral waters belonging to the same group are of considerable interest from a pharmacological as well as therapeutical point of view. Mineral waters generally contain one or at most two principal ingredients, in addition to which, however, there are habitually two or three other substances present which modify the effects of the prime constituents in a peculiar manner. These "modifiers," as I would call them, often occur in very small quantities, and have for this reason by many been considered as inoperative. Such an opinion, however, is erroneous, for careful clinical observation of the action of such waters shows the "modifiers" to be of considerable importance, so that a mineral water would find its individuality impaired or destroyed, were they to be removed. I will remark in passing that this is the principal reason why artificial mineral waters in which the "modifiers" are often left out, in order to save trouble in the manufacture, have not the same therapeutical effects as natural waters.¹

Apenta belongs to the class of bitter waters, and contains, as its principal ingredients, the sulphates of magnesium and sodium, while its chief modifiers are the chlorides of sodium and lithium. The medicinal value of bitter waters in general depends to a great extent upon the relative proportion of the two sulphates contained in them.

Pharmacological experiments and clinical experience have shown that those waters act most pleasantly in which the magnesium preponderates over the sodium sulphate, while the chloride of sodium should not amount to more than about $\frac{1}{10}$ or $\frac{1}{15}$ of the two sulphates together. Where the sodium is in excess of the magnesium sulphate, the purgative action of the bitter water is *ceteris paribus* too violent; digestion is apt to be disturbed, and if the use of the water is continued for some time, debility and a degree of anæmia will be the result. On the other hand, where the chloride of sodium is in excess, the water does not act so beneficially on the liver.

If we apply the above rules to some of the best known bitter waters we find that:

1. Püllna water contains 123 parts of sodium against 93 parts of magnesium sulphate, with 16 parts of chloride. While, therefore, the proportion of the latter is good, the excess of the sodium sulphate causes those drawbacks which I have just mentioned, and which, although the water in question is a highly efficient purgative, have been so conspicuously felt in practice in years past, that this water is now rarely prescribed.

2. Rubinat water shows a still more marked preponderance of the sodium sulphate, as it contains 1,485 parts of it against only 50 parts of magnesium, the chloride of sodium being 31. What I have just said about Püllna would therefore apply in even a more marked degree to Rubinat.

3. Saldschütz water has to be placed in the same category, for it contains hardly any magnesium at all, and owes its effect almost exclusively to the sodium sulphate.

4. Friedrichshall water appears to be decidedly superior to the three waters just mentioned, as it contains 46 parts of sodium against 39 parts of magnesium sulphate. The excess

of the sodium sulphate, which in Rubinat and Saldschütz is overwhelming, is therefore in Friedrichshall only 7, which explains the milder and more agreeable effects of the latter. On the other hand, the excess of chlorides in this water is formidable, as it amounts to 99 parts, that is, 14 parts more than the two sulphates combined. This renders the Friedrichshall water somewhat similar to sea water. Indeed, the water of the Baltic does not contain as much—namely, only 67 against 99; while the Atlantic, the Mediterranean, and the Dead Sea, contain respectively 203, 225, and 543 parts of NaCl.

5. Hunyadi János water shows a slight excess of the sodium over the magnesium sulphate, namely, 1,578 against 1,564, with 119 parts of NaCl. The latter proportion is far better than that contained in Friedrichshall, and this is probably the reason why the Hunyadi water has recently been employed preferably to the latter.

6. Franz-Josef water has very nearly the same chemical constitution as Hunyadi János, namely, 24.65 parts of magnesium, against 24.06 of sodium sulphate and 1.673 of NaCl. This composition easily explains the generally favourable results which have been obtained from this water.

7. Æsculap water is one of the best of this group. It contains an excess of the magnesium over the sodium sulphate, namely, 172 parts against 139, and a favourable proportion of NaCl, namely, 29.

8. Apenta water shows an excellent proportion of sulphates and chlorides, the magnesium amounting to 24.49, the sodium sulphate to 15.43, and the NaCl to 1.87. It is therefore a most useful aperient. In addition to this it contains an appreciable amount of lithium chloride, by which it is distinguished from all the other waters of this group. Although the quantity of this constituent is small, it is for that reason by no means devoid of effect as a "modifier."

I may here aptly draw attention to the very small quantity of iron contained in such powerful chalybeates as Spa and Schwalbach (Pouhon 0.375, and Weinbrunnen 0.443 grains in 16 ounces of water). Again, the Kreuznach Elisenquelle, which is so highly effectual in the treatment of scrofula and allied conditions, contains only 0.035 grains of magnesium iodide in 16 ounces, and the Purton water only 0.066 of sodium iodide in the imperial gallon. The presence of lithium in Apenta water explains, therefore, why a course of the latter is so useful in warding off attacks of gout, and in moderating their intensity when present.

It is useful to know that in cases where we are obliged to give morphine in somewhat considerable quantities, either *per os* or hypodermically, as for instance in the gastric crises of tabes, and in severe and obstinate forms of neuralgia, Apenta has an excellent effect in neutralising the prejudicial action of morphine on the hepatic functions. In some of these cases I had previously given small doses of mercury, podophyllin, and other drugs and mineral waters for that purpose, but none of them equalled the beneficial effects of Apenta in this respect.

The same water is useful, as an adjuvant to other treatment, in threatened cerebral hæmorrhage in the aged, where there is high tension in the vascular system, with confusion, drowsiness, etc. On the other hand, it sometimes fails to relieve obstinate constipation which arises from deficient nervous influence, as in certain forms of spinal disease, where more stimulating aperients, such as cascara sagrada, etc., find their appropriate sphere of action.

A NOTE ON THE EXAMINATION OF THE BLOOD IN MALARIAL FEVER.

By SURGEON-CAPTAIN J. G. McNAUGHT, M.A., M.D. GLASG.,
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[ABSTRACT.]

SURGEON-CAPTAIN McNAUGHT'S notes refer to the results obtained in 54 cases of malarial fever observed in the Northern Deccan from August, 1895, to June, 1896. He found the parasite in 50 cases, 130 examinations being made. The list of cases include both old and new infections. The blood was examined between 9 A.M. and 11 A.M. When he found large intracorpuscular pigmented forms of parasite, the affected corpuscle being full and swollen, he diagnosed tertian

¹ I have dwelt fully upon this point in my work on *The Spas of Europe*, London, 1862.

fever. Only 3 cases of this description were found. When he found numerous unpigmented intracorporeal forms, the infected corpuscles not being markedly enlarged, the pigmented intracorporeal forms present being small and few in number, he diagnosed "summer-autumn" fever. Forty-six cases were of this type, and in 16 of them crescents were observed. The tertian cases yielded readily to quinine.

"SUMMER-AUTUMN" FEVER.

Intracorporeal unpigmented forms were invariably found in cases examined immediately before the attack and frequently for 2 days after the temperature was normal, sometimes after being normal for 4 or 5 days. They were sometimes very numerous. Frequently in certain fields almost every corpuscle contained one. The quiescent ringed form was frequently observed, but by far the commonest appearance was that of a pale shadowy body, of constantly changing outline, looking like a stain on the surface of the corpuscle. The infected corpuscles were not swollen like those seen in the tertian cases, but on the other hand they were not shrivelled. In colour they often presented a greenish-yellow tinge, contrasting with the pale yellow of the normal ones. The intracorporeal amœbæ were very rarely pigmented. He believes that the parasite found is an unpigmented one, except as regards the forms belonging to the crescent series.

The following table shows the relative frequency with which the various pigmented forms of the "summer-autumn" parasite were found. The numbers refer to separate observations.

Crescents alone, 14.
Crescents and spheres, 17.
Crescents, spheres, and flagellated bodies, 12.
Spheres alone, 29.
Spheres and flagellated bodies, 4.
Crescents and flagellated bodies, 2.
Flagellated bodies only, 1.

From this it will be seen that flagellated bodies were observed on 19 occasions and crescents on 45 occasions.

The resistance to quinine which characterises this form of parasite is illustrated by a case in which after 12 days' apyrexia, during which the patient had been taking 30 grains of quinine daily, and had gained weight and improved in colour, very numerous spheres, crescents, and flagellated bodies were found. The sporulating form of this parasite was only observed in two cases. In one case no pigment was present, in the other six clear oval bodies were seen grouped radially round the mass of central pigment.

In these cases recurrences were frequent, the cold stage often absent and nearly always slight in character, contrasting with those which Surgeon-Captain McNaught had seen at home, in which a prolonged cold stage with rigors, blue lips, goose skin, and chattering teeth had been the rule. Although so many of the cases were "summer-autumn," dangerous complications were very rare, but persistent anæmia and enlargement of the spleen were frequent sequelæ.

The most severe cases occurred in a group of men who had contracted the disease at Karachi. These cases were sharply defined by the severity of the symptoms, intense headache and lumbar pain, pain and tenderness in the hepatic region, persistent vomiting, in some cases jaundice and hæmaturia. Microscopically, parasites of the "summer-autumn" type were found in all these cases, large free pigmented forms being specially numerous. Enteric fever frequently develops in malarial cases, the two fevers being conjoined, and the diagnosis decided on clinical evidence. In one patient the malarial parasite was observed during the whole time the patient was under treatment for enteric fever. Three cases are cited to exemplify the value of examination of the blood in diagnosis. In one the case was shown to be malaria and not tuberculosis. In another the rapid onset of the fever in a patient convalescent from enteric fever was shown not to be a relapse but to be malarial. In another, in which the symptoms suggested rheumatic fever, crescents were found in the blood, and the patient, who had at first been put on salicylate of soda, was treated by quinine with rapid improvement in his symptoms.

THE introductory address at the Royal Veterinary College will be delivered by Professor Macqueen, F.R.C.V.S., on October 1st, at 1 P.M. The Earl of Crewe will take the chair.

ON NON-VENEREAL BUBO.

By CHAS. C. GODDING, M.R.C.S.,

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[Communicated by the DIRECTOR GENERAL of the Medical Department, R.N.]

NON-VENEREAL bubo, commonly spoken of as climatic or sympathetic bubo, might be called lymphoma or adenoma. The disease is characterised by fever, enlargement of inguinal glands in one groin (seldom in both), increasing *malaise* and anæmia. The inguinal glands are invariably attacked; lymphatic vessels, or glands in other situations, never—marking the difference from lymphadenoma.

ETIOLOGY.

For many years I have been in the habit of associating these cases entirely with foreign service, and of calling them "climatic bubo;" but on looking up the "Health of the Navy" for the seven years 1888 to 1894 inclusive, I was greatly surprised at the total number of these cases, and also to find how many occurred in the Home and Irregular Forces. (See *Statistics*.) This would be accounted for to a certain extent in the Home Force by cases occurring in men recently returned from abroad, and in the Irregular Force by its employment on almost constant foreign service.

I consider the disease to be primarily constitutional, as indicated by the fever, and the bubo as purely a local symptom; but how this constitutional condition is produced, or why the inguinal glands alone are invariably attacked is difficult to ascertain; and though the large number of cases occurring in the Home and Irregular Forces militate against the name "climatic," yet climatic influences appear undoubtedly to play a considerable part in the causation of this disease. For instance, the East Indian station gives nearly four times as many cases per thousand as the Mediterranean, and the China station, where lymphoid diseases are common among the natives, comes next in order in the production of these cases, with three times as many as the Mediterranean. On the other hand, the Mediterranean, Australian, and West Coast of Africa give comparatively few cases, and are therefore climates non-provocative of this disease. I have myself seen the worst cases on the East Indian Station, at Zanzibar and adjacent coasts, the patients having huge masses of glands in the groin, often suppurating, progressive anæmia and debility.

The immediate cause of the bubo appears to be sometimes a slight sprain; at others, a superficial abrasion on penis or toes; while in some no apparent cause at all can be discovered; but in all these cases the presumed cause (or what the patient judges to be the cause) is quite insufficient to account for the long train of symptoms which follow, and are trivial accidents which would have been quickly recovered from had not the patient been constitutionally ready for the excitation of this disease. Of eleven cases I have recently treated, four gave a history of slight sprain, in four no cause at all could be discovered, two had small superficial sores on penis, and one man a small abrasion on toe. In four of these cases the glands suppurated. Age has apparently no influence. Five cases occurred between the ages of 19 and 25; two between 25 and 35; and three in men over 35.

STATISTICS.

In the seven years from 1888 to 1894 inclusive the average strength of the Royal Navy, being 56,180 per annum, 733 cases of bubo was the yearly average. During the whole period twenty men have been invalided from the service and nine have died principally from exhausting suppuration from these buboes; in one fatal case the femoral was ligatured.

The number of these cases varies considerably from year to year, but these figures show that the disease is a formidable one.

The worst stations are (1) East Indies, 31 cases per 1,000 of strength; China, 25; and West Indies, 22. Stations least affected are (1) Mediterranean, 8 cases per 1,000 of strength; Australia, 9; and West Coast of Africa, 13. The Home and Channel, with an average force of 27,000 men, gives 287 cases annually, or about 10½ per 1,000.