

were available from the delirious condition of the patient, or cases terminating by lysis. The sweating was generally of a very profuse character continuing for some hours, and leaving the patient weak and prostrate with a cold skin; in four cases distinct signs of collapse were present. The temperature, except in very severe cases, invariably became subnormal, reaching 93° in some cases, a fall of as much as 9 degrees was not of unusual occurrence.

(e) *Non-febrile stage.*—The apyrexial period was almost in all cases characterised by subnormal temperatures on the third or fourth day. After the termination of the crisis there was very frequently a short rise of two or three days' duration, this reached close to the normal or sometimes to above normal, and again fell antecedent to the occurrence of the relapse. This slight rise is pretty constant, and is due either to the slight cough so frequently present at this stage or to some condition arising from the development of the next growth of spirilla. From its delayed character I do not consider that it is due to reaction after the fall at crisis.

(f) *First relapse.*—47 cases were seen at some time or other during the first relapse.

1. *Commencement.*—This is generally less marked than in the first or invasion attack. Out of 47 cases the onset began with shivering in 18, or 38·3 per cent., in 16 cases it was doubtful, and in 13 there was no shivering. The onset is often so gradual that the patients do not know of its occurrence.

2. *Date of relapse.*—The average date of the commencement of the relapse was 12·97 days after the onset of the first attack—taken roughly the 13th day, the shortest and longest dates being the 10th and 16th day, respectively.

3. *Days of relapse.*—The average duration in 43 available cases was 4·46 days, the extremes being two and six days. In some cases it was of so short a duration and so mild a character as to almost escape observation.

4. *Average of temperature.*—Is given in the chart for the first four days, and this gives a fairly good idea of the temperature curve that is seen in some cases. The temperature was more remittent, and sometimes, though not always, higher than that of the first attack.

5. *Termination of the relapse.*—Out of the 44 cases in which it was observed, 40 or 90·9 per cent. terminated by crisis and four by lysis. Sweating was noticed in 40, or 90·9 per cent. of the cases, doubtful in three and absent in one case. The temperature at the crisis of the relapse in many cases reached a lower point than in the first crisis. Termination of crisis was three times as common in the morning as in the evening.

(g) *Other relapses.*

1. *2nd relapses* were seen in 10 cases; the average date of commencement was on the 19th,

day with the 17th, and 22nd, days as extremes. The average duration was four days, the extremes one and six days.

2a. *3rd relapse* was only seen in one case; it began on the 26th day and lasted three days.

Several of the more severe cases of relapsing fever seen, appear from the temperature charts to have had a relapse almost superimposed on the first attack, whether these should be considered or not as true relapses it is doubtful to say. I have failed in all cases of this nature to detect the spirillum in the blood during this renewed pyrexial period. One case, not included in the 91 cases, was seen, which from the regularity with which the temperature became normal or subnormal every sixth or seventh day, I have been inclined to consider to have been of a severe form of this disease; no examinations of the blood were made till the 16th day of the disease, but neither this nor six subsequent examinations resulted in the discovery of the spirillum.

(To be continued.)

A PRELIMINARY NOTE ON CÆSOPHAGOSTOMA COLUMBEANUM CURTICI.

BY SURGEON G. M. GILES, I.M.S.
Sanawar.

It is a well-known fact that sheep thrive very ill in Burmah, Assam, and the Indo-Chinese Peninsula generally. So much is this the case that indigenous mutton is practically unobtainable, and European residents have to depend for their supplies on "mutton clubs" which import sheep ready fattened from Bengal, and slaughter them as soon as possible; as, if kept for any length of time in these localities, they quickly get into poor condition and die. This happened last year in the case of a flock imported by Mr. Fenton, of the Shillong Hotel, who had started a "mutton club," for the use of his hotel and the residents generally. He made the mistake of importing too large a number to start with, and, after about a month, the previously excellent mutton became poor. In another month he had to stop supplying his subscribers, no sheep remaining fit to kill, and by the end of the season, the greater part of the flock had died off from a mysterious disease characterised by anæmia and exhaustion, and often complicated with diarrhœa; the result being that we had to fall back on inferior bazar mutton, and the enterprising manager of the "club" was out of pocket by many hundreds of rupees. This is no new experience in Assam, the difficulty of keeping sheep there being notorious.

The resemblance in some particulars of the epizootic to one at the same time prevalent among the transport mules, and which I had demonstrated was due to the ravages of sclero-

stomum tetracanthum, led me to suspect that the sheep too might be the victims of strongyle parasites, and I accordingly examined the droppings of some of the affected animals, and found typical strongyle ova present in large numbers in every case. I then got Mr. Fenton to send me the carcass of the next victim to the epizoöty.

The carcass swarmed with parasites some six distinct species being present. No other possible cause of death, save their presence, could be discovered on a most minute examination of the viscera. Amongst the species was a strongyle of moderate size, which clearly had the same habit as *S. tetracanthum* of horses, and it was to this species that I was inclined to impute the fatality. I was, however, unable to identify it, and believed it to be new to science, and was about to describe it when I noted a critique on a work, monographing the parasites of sheep, which had just been issued by the Agricultural Bureau of the United States, and determined to wait until I could obtain it.

It has only now just come to hand, and has enabled me without difficulty to identify my species as *oesophagostoma columbeanum*, which it described in the work in question as new to science; Dr. Curtice, the author, believing it to be peculiar to America and surmising it to be naturally parasitic in some indigenous species of deer, and to have merely found a new congenial home among the sheep originally imported from Europe. In this, it appears he must now be considered in error, as it is very unlikely that the long standing inability of sheep to live in Burmah and Assam, dating back as it does to a period when intercourse with America was very rare or unknown, should be due to any but an indigenous parasite.

On the other hand of late years, a considerable trade has existed between India and America, and it is highly probable that livestock bought in India for consumption on the voyage, may have been landed in America and have served as a starting point for the disease on that continent.

Dr. Curtice, whose work is in every way most full and admirable, and splendidly illustrated, states that in some of the South Eastern States, it is impossible to rear sheep "with profit," owing to the ravages of this parasite, and, though my observation is but an isolated one, it is obvious that it can hardly be present here without producing a like effect.

It is curious that this parasite should have been within a short interval, independently discovered in two such opposite regions of the globe as America and Assam; for, indeed, had Dr. Curtice's monograph been issued but a few months later, the species would have appeared with the specific name of "*Orientalis*" instead of "*Columbeanum*."

THE NEW THEORY OF HEREDITY.

(*A Synopsis.*)

BY SURGEON W. J. BUCHANAN, B.A., M.B.

ANY one who has read the discussions in the section of psychology at the late meeting of the British Medical Association must have been struck by the extremely vague views on the subject of heredity possessed by the speakers. One speaker, indeed, went so far as to question the truth of the idea of heredity; none of the others showed that their knowledge rose above certain popular notions about inheritance. On reading this, it seemed that it might be useful and interesting to the readers of this paper if a brief and accurate account of the latest views on the subject were given. We see too often in medicine how the idea of heredity is evoked as an etiological factor in many diseases. In cancer or leprosy for example, heredity is claimed by some to be all-powerful, while others deny its influence *in toto*. In view of the new theory to which we refer, the whole question of the inheritance of disease will have to be reconsidered. I hope at some future time to be able to attack that subject, at present the subject will only be sketched in its purely biological aspect. In a review in these columns some months ago this subject was briefly touched upon.

The theory I am now about to synopsise is that of Prof. Weismann, of Frieberg. It is curious how little attention has been paid to these views, revolutionary though they are, except by the biologists. If this theory is true, it is the most important contribution to biology and evolution since the publication of Darwin's *Origin of Species*. Till this view is thoroughly grasped, it is mere waste of time to speculate how far disease is capable of being transmitted from parent to offspring.

The problem of heredity is one which has hitherto baffled investigation. Its phenomena are not in their nature incomprehensible. It is only the great complexity of the subject which has till now rendered it insuperable.

Heredity in its common acceptation may be defined as that property of an organism by which its peculiar nature is transmitted to its descendants. From an eagle's egg an eagle of the same species develops. Not only are the characters of the species transmitted to the following generation, but even individual peculiarities. The offspring resembles its parents among animals as well as man. Heredity can be easily understood in the case of unicellular organisms (*infusoria*, &c.) They multiply by the simple process of division, each part becoming exactly alike in structure and size. Among multicellular organisms, however, the problem is more difficult. Darwin, it is well-known, by his purely formal and provisional hypothesis of Pangenesis