

the value of a routine examination of all sera of patients with pyrexia where the diagnosis remains in doubt. By the means of this test we have at times been able to give the first indication to the clinician that the patient is probably suffering from a typhus-like disease. We have never found a serum giving any agglutination of *Bacillus typhosus* or *Bacillus paratyphosus* in addition to agglutination of *Bacillus proteus*. In many cases where the clinical picture is not clear-cut, a diagnosis may rest on the Weil-Felix reaction.

We have no knowledge of this test having been performed as a routine examination in any other part of Australia and, until this is done, it cannot be claimed with any degree of certitude that the disease under review is not to be found elsewhere in Australia than in this State. In performing such a routine examination it is essential to bear in mind that (i.) the bacillary emulsion should not be formolized or preserved in other ways, but must be made from young living cultures of the bacillus (Wilson's method of using desiccated bacilli has not been tried); (ii.) repeated examinations of serum from the same patient at intervals of two or more days may be necessary in order to detect the presence of agglutinins and (iii.) no serum should be considered as giving a positive reaction unless agglutinating in a dilution of over 1 in 40 and it should be demonstrated that the titre of agglutination rises in early convalescence. It has been found that a serum giving a high titre of agglutinins may be preserved when collected aseptically and kept in the ice-chest. It has been our practice for some time to use such a serum as a control of the agglutinability of the bacillary emulsion prepared daily.

All the tests described above have been performed by Miss E. Cleland.

#### Reference.

- W. J. Wilson: "The Serological Test in Typhus: A Stable and Sensitive Diagnosticum," *The Lancet*, 1922, Volume I., pages 222 and 223.

### POSSIBILITIES IN THE TRANSMISSION OF ONCHOCERCA GIBSONI.<sup>1</sup>

RECORDED BY R. W. CLENTON, M.D., B.S., D.T.M. & H.,  
Director, Australian Institute of Tropical Medicine,  
Townsville.

THE recorded observations on the transmission possibilities of *Onchocerca gibsoni* have so far failed to yield any definite result and it is thought that the facts here presented may to some slight degree help to elucidate this obscure problem.

It is recognized that there is a wide margin of error and it is not claimed that the observations now recorded are in themselves scientifically accurate, but they are of notable significance.

In the first place, at a sale of cattle at Kingaroy on November 23, 1917, Mr. Rheuben, Meat Inspector, to whom I am indebted for the observations, examined about twenty head

of cattle awaiting sale. During this operation he noted a large tabanid fly alight on a cow and attach itself to it for some five minutes. As the tabanid group had from time to time been under suspicion as a possible carrier of the disease, the cow was bailed up and examined. Mr. Rheuben, who is an expert in the manipulation of live animals, could detect no nodules in the neighbourhood of the bite. The cow happened to be sold to a New South Wales cattle dealer and in consequence it was necessary to quarantine it for some months before admission into that State. When a month had elapsed, the cow was due for dipping and the area bitten, which had previously been marked, was closely examined. A distinct nodule about the size of a grain of rice was palpable.

At a subsequent date Mr. A. E. McGown, then Veterinary Surgeon to the Department of Stock at Townsville, allowed a bullock to be set aside for experimental purposes at the Stock Experimental Station. The greatest care was taken to ascertain that there were no nodules present, several competent examiners being agreed that nothing was palpable.

Following the rains a number of tabanid flies were caught, about seventy in all, and in six of these unidentified nematodes were detected in the neighbourhood of the proboscis. The heads of these six flies were taken at once from the slides as detected and transferred to serum prepared by Mr. McGown from the blood of the bullock in question.

Further examination was then made for nodules, but the closest scrutiny could not determine the presence even of the smallest. A small incision in the shape of a pouch was made and, while depositing the heads of the six flies therein, in drawing a cork from a small glass tube with a pair of forceps, Mr. Rheuben accidentally broke off a piece of the tube which was not recovered. The pouch was sealed with collodion and healed in a few days. A month later examination showed two nodules about the size of rice grains over the area where the experiment had been made. The bullock was examined at intervals of a fortnight and one nodule came to be as large as a good-sized almond. This was subsequently dissected out by Mr. McGown's successor, Mr. J. Legg, and it was found that the piece of glass accidentally broken off was firmly embedded in the capsule. Both Mr. Legg and Mr. Rheuben were satisfied that the nodule was an ordinary onchocercal nodule.

The bullock was subsequently sold to a firm of butchers in Townsville and Mr. Rheuben, in his capacity as Meat Inspector, had an opportunity of examining the body after slaughter. In all, four worm-nests were discovered within 3.8 centimetres (one and a half inches) of the spot at which the experimental incision had been made. No other nodules were present in the animal.

At a subsequent date (August 2, 1922), while assisting several men to free a bullock bogged in a small creek, Mr. Rheuben noticed a large tabanid biting the animal and marked the spot. Examination having failed to produce evidence of any infesta-

<sup>1</sup> Received for publication on March 26, 1923.

tion with nodules, the bullock was set aside for a month before slaughter. On removal of the hide, to the great interest of Mr. Rheuben, who superintended the operation, there appeared at the site of the bite a coiled worm in a state of commencing encapsulation. Careful dissection allowed of the removal of a worm which, on being uncoiled, was found to be 17.8 centimetres (seven inches) in length. Mr. Legg, of the Stock Experimental Station, pronounced it on examination to be definitely *Onchocerca gibsoni*. The worm is at present preserved in the Museum of the Stock Experimental Station, Townsville.

The species of tabanid flies which were concerned in the second observation, were identified by Mr. Gerald Hill as being in the main *Tabanus germanicus* and *Tabanus aprepes*.

From information supplied by Mr. Hill,<sup>(1)</sup> based on observations made during the period October, 1919, to September, 1920, it appears that the larvæ of *Tabanus aprepes* may be generally found in all stages of development during the latter part of the wet season in Townsville (namely, from February to April inclusive) on or near the surface of clear and moderately deep pools, amongst submerged herbage near the banks, upon the submerged stems and leaves of aquatic plants of all kinds and in floating masses of algæ.

The larvæ appear to live in the water until they have reached maturity, when they migrate from the water to high ground close by and penetrate into the soil or clay to a depth of from seven to fifteen centimetres, where they remain in the larval stage, generally with head uppermost, for several months.

**Seasonal Occurrence.**—Throughout Australia, perhaps excepting the wet belts of the North Queensland coast, there is a marked seasonal occurrence of flies of this family, namely, from about October to April.

It is readily conceded that in the observations on *Onchocerca gibsoni* recorded above there is nothing to prove that actual infestation was directly due to the bite referred to in each case. Similarly, except by slaughter and examination, it could not have been demonstrated that the animal in question was free from infestation at the time of the observation and prior to the biting, though all possible steps were taken to determine such infestation with negative results.

A series of observations, however, which proceed from the detection of a definite though tiny nodule occurring after a bite to the actual detection of a worm parasite, identified as *Onchocerca gibsoni* in a stage of partial encapsulation, the approximate relation between the wide-spread distribution of the tabanid fly and of the diseases in North Queensland and common opinion which indicates a much greater prevalence in those districts in which tabanids chiefly are bred out, indicate the possibility that the relationship between the bite of the fly and the appearance of the nodule may not be merely coincidental, but may prove to be one of cause and effect.

#### Reference.

<sup>(1)</sup> Hill, Gerald: "The Bionomics of *Tabanus aprepes* and Other Australian Tabanidæ," *Bulletin of Entomological Research*, Volume XII, Part I, June, 1921.

## Reports of Cases.

### DEATH FROM PROGRESSIVE EMPHYSEMA.

By C. G. McDONALD, M.B. (Syd.),  
Honorary Assistant Physician, Royal Prince Alfred  
Hospital, Sydney.

ALTHOUGH chronic emphysema is a progressive disease ending fatally, the last illness of patients suffering from this complaint is so frequently complicated by affections of other organs, notably the kidneys, that the possibility of death due to emphysema is sometimes forgotten.

W.J.B., a short, stout, thick-necked labourer and a native of Middlesex, England, came to Australia sixty years ago, at the age of three. Early in life he became a labourer, working on odd jobs. Soon he became an employee of the Kogarah Municipal Council and worked on the roads for twenty-six years. For the final eight years of his life he was employed as a main-layer by the Australian Gas-Light Company, Limited. He was twice wedded, having four children by his first and six by his second wife.

Up to twenty years ago he was slight and short, but at the age of forty he commenced to assume the corpulence of middle age. In 1901 he had his first severe illness, acute bronchitis, which caused him to expectorate blood-stained sputum. This illness had been preceded for a few years by the development of a keen taste for alcohol, chiefly beer. His surviving wife states that during his drinking bouts he frequently failed to arrive home, spending the night on some vacant allotment under the stars. Beer and a well-filled pipe, the generous handmaids of emphysema, were the two failings of this kindly, hard-working soul. But for the devoted attention of his wife, his career might have been much briefer. Afraid of pneumonia, on the least suggestion of a cold, she would put him to bed and nurse him. Yet every winter for more than twenty years he suffered from a winter cough. These attacks of bronchitis were marked by dry, paroxysmal cough, wheezing, a sense of constriction across the front of the chest and nocturnal orthopnoea. In the words of his wife, he coughed with tremendous force.

In the last four years of his life the attacks became very bad. Once he staggered home from work. His wife made a plausible but incorrect diagnosis and did not as usual go out to meet him. Her husband was not drunk this time. He was suffering from the dyspnoea of emphysema so well described by Samuel Gee. His face was purple; he reeled from giddiness and a hopeless, spasmodic cough shook his chest. On entering his home he fell unconscious to the floor. For two years prior to death he made use of a motor 'bus to take him to the train, a distance of a quarter of a mile. The gradual ascent of a long hill was too much for him. While at rest he was comfortable, but on the least effort attacks of dyspnoea came on. How he was able to work within a few months of death seems incredible. A stout heart and a cheerful disposition carry a man a long way.

When I examined him in April, 1922, he had all the signs of advanced emphysema. His chest was so ballooned that his neck seemed abnormally short. The sterno-mastoid and scalene muscles stood out like cords, even when he was at rest. The breath sounds were indistinct, but sonorous rhonchi and sibilant were audible all over his chest. His wheezing and shortness of wind gave a staccato expression to his voice. The amount of expansion on forced inspiration was very small. The heart showed physiological dilatation, especially on the right side. The veins in the neck were full. The systolic blood pressure was 165 millimetres of mercury, the diastolic 100 millimetres. No abnormality of the urine was detected. The exhibition of iodide of potassium gave him temporary relief.

Early in September, 1922, there was definite cardiac failure and his life was obviously nearing its end. The apex beat could just be felt in the fifth interspace, slightly anterior to the anterior axillary line. There were no murmurs. The legs were oedematous and there was evidence of free fluid in the fat abdomen. The urine contained a moderate amount of albumin, due to the renal congestion. The large, emphysematous chest was now