

NOTES ON THE CHEMOTHERAPEUTIC TREATMENT OF BILIARY FEVER IN DOGS.

BY DR. K. F. MEYER.

FOR a long time chemotherapeutic attempts have been made with varying results to cure this fatal disease, canine piroplasmosis. Lately *Nuttall* and *Hadwen*, *Jowett*, and others, reported on the successful treatment by means of dyes belonging to the Benzidine "Naphtyl-aminsulfo" group. In a short note *Nuttall* refers to all the drugs used in the treatment of biliary fever during recent years and I think therefore it is not necessary for me to recapitulate all the literature on the subject. Amongst the medicaments which exerted the greatest influence on the piroplasma *Trypan-red* and *Trypan-blue* are found. In his first report he mentioned two cases where the *Trypan-red* treatment was successful, but he did not directly recommend it for treatment in the field. Since the results obtained later in the treatment of trypanosomiasis with *Trypan-red* did not bear out the success promised by the first experiments it was natural that the results obtained with the chemicals mentioned above for the treatment of piroplasmosis were also accepted with a certain scepticism, because the virulency, variability, etc., of the different strains of virus used for such experiments are important factors to be taken into consideration. We thought an experiment on a number of animals would be the best means of testing the conclusions of *Nuttall* and his *co-worker*. It may be mentioned here, that in a country where piroplasmosis is very frequent, only a test on a number of animals would exclude any of the partial immunity found in dogs from affecting the results. About twenty-four dogs were especially devoted to the *Trypan-red* treatment, and a few others were used for *Trypan-blue*, and one for brilliant-green. We used different strains of virus and animals of different ages, with sufficient controls.

(A) *Trypan-red*.—*Trypan-red* is chemically a tetrazo compound of benzidin-monosulphate and 2, 3, 6, β naphtylamin disulphanate of sodium. It was used for the first time by *Ehrlich* and *Shiga* for the treatment of trypanosomiasis. The administration of the drug was always carried out with a freshly-prepared solution in sterile water (1 to 5 per cent.), and injected subcutaneously. In a few cases intravenous injections were also used, but later we returned to the old method of subcutaneous injection. It was observed in several cases that the application of toxic substances, such as *Trypan-red*, had an influence on the secreting organs, and especially on the kidneys, which are doubtless primarily affected by the piroplasmosis. The breakdown of the red blood corpuscles seems also to be accelerated by the injection of *Trypan-red* into the blood stream, and haemoglobinuria was always observed as a sequel of this treatment. With regard to the subcutaneous application, the following may be noted: Occasionally abscesses at the seat of the injection were observed. In a few cases they were probably due to the working with non-sterile instruments, but individual disposition, as often observed in human beings, favours as a sequel of the injection of chemical composition an irritation and local swellings, with the formation of sterile pus. My observations support the idea that a subcutaneous injection of the drug was never followed by a

local swelling if freshly prepared and filtered solutions were used. If a muscle was wounded, or if it happened that the whole drug was injected into a muscle, local irritation was always present. Considerable necrosis and similar lesions were once observed in a horse as a sequel to such an inoculation, where a part of the muscle brachiocephalicus was finally eliminated by a process of demarcation. All these accidents could be avoided if carried out subcutaneously. The seat of the inoculation in dogs was always between the two shoulders, on the back; after the skin was disinfected with alcohol the inoculation was made. A 1 to 2 per cent. solution, inoculated in a dose of 3 to 5 c.c. at one place, proved to be most suitable. For intravenous inoculation, 1 per cent. solution, by preference at body temperature, was used. The effect of the drug on the body of the animal was demonstrated by a red discolouration of the conjunctiva, mucous membrane of the mouth, etc., about two and a half to three hours after injection. This discolouration takes a dark-reddish or slightly-yellowish tinge about eight hours after the application of the drug. Varying with the quantity of Trypan-red inoculated these symptoms disappear in about a fortnight, but often not before six weeks after the last administration of Trypan-red. In several cases elimination through the urine could be observed. In all cases where recently treated dogs died the *post-mortem* examination showed in the organs a dark-reddish discolouration more or less influenced by the general jaundice.

THE EXPERIMENTAL ANIMAL.

In our experiments only dogs artificially infected by inoculation of blood containing *P. canis* were treated. The control of the infected dogs was made by observing symptoms and by thorough microscopical examination of the blood. Clinically all the dogs treated were obviously ill. The disease was produced with four different strains, because it is a well-known fact that the virulency of the different piroplasma strains differs, and naturally the results vary. It was necessary to use a great number of experimental dogs as controls, to exclude partial immunity, which would naturally influence the experiments. It was first expected that the results of the treatment would be better than those obtained in Europe, because this partial immunity would beneficially assist the effect of the drugs. In several cases treated by *Jowett* with Trypan-blue, this was probably the case. Altogether eighty-eight dogs were infected, and all were kept under the same conditions without any special nursing.

The two cases recorded by *Nuttall* and *Hadwen* are just the contrary of two experiments carried out by *Levidella Vida* in 1907. In both cases there were only two dogs used for the experiment, and therefore they cannot be considered to be convincing. The number of the animals used, distributed among the different strains, was as follows:—

Original strains—

Dog with acute piroplasmosis—*Pretoria strain*.

Dog with acute piroplasmosis—*Johannesburg strain*.

Dead dog: chronic piroplasmosis—*Onderstepoort strain 1*.

Living pup: with chronic piroplasmosis—*Onderstepoort strain 2*.

The number of dogs used for the different strains was as follows:—

Injection of 8 dogs—*Pretoria strain*.

Injection of 50 dogs—*Johannesburg strain*.

Injection of 9 dogs—*Onderstepoort strain 1*.

Injection of 21 dogs.—*Onderstepoort strain 2*.

Total number, eighty-eight dogs, subcutaneously inoculated with virulent blood in a quantity of 2 to 5 c.c. for each animal.

They were treated as follows:—

Trypan-red :

| | | |
|--------------------------------|----|--|
| Pretoria strain | 2 | (665 and 666). |
| Johannesburg strain | 15 | (653, 660, 624, 735, 738, 744, 752, 756, 701, 721, 839, 675, 732, 687, and 739). |
| Onderstepoort strain 1 | 3 | (795, 799, and 786). |
| Onderstepoort strain 2 | 4 | (840, 842, 846, and 848). |
| TOTAL | 24 | animals. |

Trypan-blue :

| | | |
|--------------------------------|---|----------|
| Onderstepoort strain 2 | 2 | |
| Johannesburg strain | 2 | |
| TOTAL | 4 | animals. |

Brilliant-green :

| | | |
|--------------------------------|---|---------|
| Onderstepoort strain 2 | 1 | |
| TOTAL | 1 | animal. |

TOTAL number of dogs treated 29

As control dogs were used in the different experiments:—

| | | |
|--------------------------------|----|--|
| Pretoria strain | 2 | (608 and 667). |
| Johannesburg strain | 17 | (669, 670, 671, 731, 733, 740, 745, 680, 690, 753, 757, 677, 685, 689, 704, 834, 902). |
| Onderstepoort strain 2 | 3 | (794, 805, and 798). |
| Onderstepoort strain 2 | 10 | (835, 841, 836, 844, 847, 872, 873, 847, 876, and 896). |

TOTAL number of controls used 32 animals.

Of the remaining dogs used the following had to be considered to be immune or partially immune:—

| | | |
|--------------------------------|----|----------------|
| Pretoria strain | 4 | = 50 per cent. |
| Johannesburg strain | 16 | = 32 per cent. |
| Onderstepoort strain 1 | 3 | = 33 per cent. |
| Onderstepoort strain 2 | 4 | = 19 per cent. |

TOTAL number of immune dogs .. 27 = 31 per cent.

The dogs treated with Trypan-red were distributed amongst the following strains:—

| | |
|--|----|
| Pretoria strain | 2 |
| Of these two were used and both died. Mortality, 100 per cent. | |
| Johannesburg strain | 15 |
| Five alive, ten died. Mortality, 67 per cent. | |
| Onderstepoort strain 1 | 3 |
| Three died. Mortality, 100 per cent. | |
| Onderstepoort strain 2 | 4 |
| One alive, three died. Mortality, 75 per cent. | |

Of twenty-four dogs treated with Trypan-red six are living and eighteen died, the mortality being therefore 75 per cent.

Comparison with the mortality of the controls, which is 81 per cent., and is as follows:—

| | | |
|------------------------------------|----|---------------|
| Controls in Pretoria strain | .. | 2 |
| Two died. Mortality, | | 100 per cent. |
| Johannesburg strain.. | .. | 17 |
| Six alive, eleven died. Mortality, | | 65 per cent. |
| Onderstepoort strain 1 | .. | 3 |
| Three died. Mortality, | | 100 per cent. |
| Onderstepoort strain 2 | .. | 10 |
| Ten died. Mortality, | | 100 per cent. |
| TOTAL number of controls | .. | 32 |

Of these thirty-two dogs six are living and twenty-six died; the mortality therefore is 81 per cent.

Only those dogs which showed 0·1 to 0·3 per cent. of red blood corpuscles infected for a few days, or never revealed any parasites in the blood, were counted as partially or completely immune. This number corresponds with the observations made in other experiments on this matter.

The records given above are contrary to those of *Nuttall's* experiments, and indicate that Trypan-red had no efficacious influence on canine piroplasmiasis. I think we may here make the statement based on twenty-seven treated dogs and thirty-two control dogs that the therapeutic value of Trypan-red is very small. An influence on the numbers of the parasites as a sequel of the injection, was always noted, but it never had the effect shown in the records of *Nuttall* and *Hadwen*. Sooner or later, and often just after the inoculation, the parasites reappeared in the blood, and generally increased in number, naturally causing the death of the animal. The influence of a second, a third, or a fourth inoculation of Trypan-red exerted no visible effect on the piroplasms, a fact which is well known in all chemotherapeutic experiments, because the parasites become accustomed to the toxin. In our cases they were "Trypan-red resistant". Utilising the statements on the mode of development of *P. canis* by *Nuttall* and *Graham Smith*, and using his terms,* the effect of the drug on the morphology of piroplasma canis is as follows:—

The pyriform parasites are the first affected. They disappear for a short while, but reappear later in great numbers. The regularity with which they appeared in the records of *Nuttall* and *Hadwen* in the control dogs, as well as in the treated dogs, was never present in my experiments in such a manner as to allow this fact to be used for a comparative criticism. Control dogs often showed numbers of parasites which were higher than those in the treated dogs, but yet they recovered from the disease.

From the records which are attached we can state that probably only in those cases where a partial immunity was present could any effect of the drug be demonstrated. The presence of parasites in an untreated and two treated animals is shown hereunder. It will be seen that the influence is not pronounced.

* P—Pyriform parasite.
 PP—2 Pyriform parasites.
 O—Amoeboid parasite.
 D—Dividing form.
 PPPP—4 Pyriform parasites,
 and so on.

Record of treated dog.

| | 9 o'clock | 12 o'clock | 2 o'clock | 4 o'clock | 6 o'clock |
|---|-----------|------------|-----------|-----------|-----------|
| Percentage of red blood corpuscles infected | 2.3 | — | 1.2 | 0.7 | 0.2 |
| Percentage of p.p. | 0.7 | — | 0.1 | 0.1 | 0.0 |

Record of treated dog (660). 7th October, 1910.

At two-hour intervals.

| | 9 o'clock | 12 o'clock | 2 o'clock | 4 o'clock | 6 o'clock | 8 o'clock | 10 o'clock | 12 o'clock |
|---|-----------|------------|-----------|-----------|-----------|-----------|------------|------------|
| Percentage of infected red blood corpuscles | 7 | Tr. | 5.2 | 12.4 | 2.4 | 0.8 | 0.2 | 2.2 |
| Percentage of p.p. | 1.8 | Tr. | 2.2 | 4.6 | 1.4 | 0.2 | 0.0 | 0.6 |

Record of treated dog (665). 7th October, 1910.

At two-hour intervals.

| | 9 o'clock | 12 o'clock | 2 o'clock | 4 o'clock | 6 o'clock | 8 o'clock | 10 o'clock | 12 o'clock |
|------------------------------------|-----------|------------|-----------|-----------|-----------|-----------|------------|------------|
| Percentage of red blood corpuscles | 5.8 | Tr. | 11.0 | 9.8 | 0.6 | 2.6 | 6.4 | 5.6 |
| Percentage of p.p. | 1.6 | Tr. | 4.4 | 6.4 | 0.0 | 1.0 | 2.4 | 1.8 |

These records demonstrate that a slight decrease of parasites takes place continuously towards the evening. In other cases it was demonstrated that the number is always varying between the morning and the evening, and that especially in the evening the number of parasites is very low. On the other hand it is shown that as a sequel of the treatment in the hours following injection, a distinct increase and then a decrease of the parasites took place. The decrease is partly due to the effect of the drug, which is visible in six to eight hours, and partly to the daily variations. The increase after inoculation is due probably to the effect of the drug on the blood vessels, the tonus decreasing, and more infected blood corpuscles, which lay generally along the blood vessels, find access into the circulation. The well-marked decrease, as is described in one case by *Nuttall* and *Hadwen* was never observed by me as a sequel of Trypan-red injection. That a second inoculation never had the same effect as the first is demonstrated in the records, and the observations therein correspond with all the similar experiments on trypanosomiasis. Whether the parasites are really killed under the influence of Trypan-red is doubtful. The degenerative symptoms are very insignificant, as was demonstrated. I think that only further experiments will give a definite decision. The fact that under these conditions the curative effect is very small, is quite clear.

Generally speaking, all the dogs which recovered passed through the disease in a way similar to that observed in chronic piroplasmiasis: piroplasms disappeared and reappeared irregularly.

An *immunitas sterilisans magna* in the sense of *Ehrlich* could therefore not be expected, a fact which was also demonstrated by *Nuttall*.

(B) *Trypan-blue*.—This drug is chemically a tetrazo compound of toluidine and amido-naphthol-sulphonate of sodium, and with this dye the conditions of treatment and the curative effect are different. My experiments were only few in number and therefore do not allow of a definite decision.

As is shown in the following records, compared with the control dog in the Trypan-red experiment, the effect is pronounced.

Record of dog (875). 27th January, 1910.

| | | | | | |
|---|---------|---------|--------|--------|--------|
| | 10 o.c. | 12 o.c. | 2 o.c. | 4 o.c. | 6 o.c. |
| Percentage of red blood corpuscles infected | 8.2 | 1.6 | 2.2 | 0.3 | 0.5 |
| | | Tb. | | | |
| Percentage of p.p. | 1.7 | 0.4 | 0.6 | 0.0 | 0.0 |

The parasites disappeared on the 28th, and reappeared on the 7th February (thirteen days) in increased numbers.

Record of dog (878). 24th January, 1910.

| | | | | | | | |
|---|---------|---------|--------|---------|--------|--------|---------|
| | 10 o.c. | 12 o.c. | 2 o.c. | 4 o.c. | 6 o.c. | 8 o.c. | 10 o.c. |
| Percentage of red blood corpuscles infected | 2.1 | Tb. | 2.7 | Not ex. | 0.5 | 0.6 | 0.5 |
| Percentage of p.p. | 1.1 | Tb. | 1.5 | Not ex. | 0.0 | 0.0 | 0.0 |

The parasites disappeared on the 27th January and reappeared on the 3rd February (seven days afterwards) in increasing numbers.

From these records the following deductions may be made:—

(1) The parasites in a typical case of canine piroplasmosis disappeared after a Trypan-blue injection during the next twenty-four hours, when 1.6 per cent. blood corpuscles were infected, and in another case forty-eight to sixty hours after the inoculation. As was stated by *Nuttall* and *Hadwen* the pyriform parasite disappeared entirely.

(2) About six to ten days afterwards relapses were observed. This observation corresponds with the results in practice, because very frequently an acute case of piroplasmosis passes under the influence of the treatment to a chronic case, and as was stated by *Nuttall* and *Hadwen* and *Jowett*, a secondary injection has not the same deleterious effect as the first inoculation. The conditions of the resistance were therefore the same as were observed a long time ago by *Ehrlich* and his pupils, in trypanosomiasis. Microscopically the system of degeneration of the intracorpuseular parasites are more pronounced than in Trypan-red treatment.

(C) *Brilliant-green*.—Only one dog was treated with this drug. It did not seem to have any influence on the piroplasma, but on the other hand the dog had probably partial immunity, and therefore recovered from the disease. This case is an illustrative example to demonstrate the effect of a drug in partially immune dogs. The results obtained by *Nuttall* are just the contrary, and it shows the difficulty of drawing conclusions from experiments on these lines in a country where piroplasmosis is very frequent.

Conclusions.—From the experiments carried out for the demonstration of the curative effects of two drugs, the following deductions may be made:—

(1) The drug *Trypan-red*, tested on twenty-four dogs, had no efficacious effect. Eighteen dogs (75 per cent.) succumbed to piroplasmosis infection. The six remaining dogs which recovered are, compared with the control dogs, partially immune, and therefore useless for judging the results.

(2) The drug *Trypan-blue*, tested in four cases, demonstrated a marked effect on the parasites, and had therefore also an effect on the recovery from a piroplasmosis infection. The number of animals treated is really too small to allow of a definite decision. It would be advisable to control the records of *Nuttall*, *Hadwen*, and *Jowett* in the same way as is done in my experiments for *Trypan-red*.

REFERENCES.

(1) *Jowett, W.*—Biliary Fever or Malignant Jaundice of the Dog (Canine Piroplasmosis). The drug treatment. *Agricultural Journal*, Cape of Good Hope, XXXV, pp. 429 and 442. An abstract also appeared in the *Veterinary Journal*, LXV. Biliary Fever or Malignant Jaundice of Dogs (Canine Piroplasmosis), *Veterinary News*, London, VI, pp. 625, 626.

(2) *Nuttall, G. H. F.*—The Drug Treatment of Canine Piroplasmosis. *Parasitology*, Volume 2, No. 4, February, 1910, pp. 409-434.

(3) *Nuttall and Graham Smith, G. S.*—Notes on the Drug Treatment of Piroplasmosis. *Parasitology*, volume 1, pp. 220-226.

(4) *Nuttall and Hadwen, S.*—The Successful Drug Treatment of Piroplasmosis, together with Observations upon the Effect of Drugs on *Piroplasma canis*. *Parasitology*, volume 2, pp. 156-191.

(5) *Nuttall and Hadwen, S.*—Further Experiments upon the Drug Treatment of Canine Piroplasmosis. *Parasitology*, volume 2, pp. 229-235.

TABLE OF TEST AND CONTROL DOGS.

| Treated Dogs. | Percentage of Red Blood Corpuscles Infected. | Result. | Control Dogs. | Percentage of Red Blood Corpuscles Infected. | Result. |
|---------------------------|--|---------|---------------|--|---------|
| PRETORIA STRAIN. | | | | | |
| Dog 665 TR. .. | 11.0 | Dead | Dog 669 .. | 2.6 | Dead |
| " 666 TR. .. | 12.4 | " | " 667* .. | 15.4 | " |
| JOHANNESBURG STRAIN. | | | | | |
| Dog 653 TR. .. | 12.2 | Dead | Dog 669 .. | 14.2 | Dead |
| " 660 TR. .. | 17.6 | " | " 670 .. | 2.2 | " |
| " 624 TR. .. | 20.2 | " | " 671 .. | 1.1 | " |
| " 735 TR. .. | 14.2 | " | " 731 .. | 13.4 | Alive |
| " 738 TR. .. | 3.4 | " | " 733 .. | 4.0 | Dead |
| " 744 TR. .. | 9.6 | " | " 740 .. | 1.1 | Alive |
| " 752 TR. .. | 2.2 | " | " 745 .. | 2.8 | Dead |
| " 756 TR. .. | 5.2 | " | " 753 .. | 9.0 | " |
| " 701 TR. .. | 2.1 | Alive | " 757 .. | 2.6 | " |
| " 721 TR. .. | 1.6 | " | " 677 .. | 0.8 | " |
| " 839 TR. .. | 3.3 | Dead | " 680 .. | 9.2 | Alive |
| " 675 TR. .. | 0.9 | Alive | " 685 .. | 3.1 | Dead |
| " 732 TR. .. | 0.3 | " | " 689 .. | (1.8) | " |
| | | | | Relapse | |
| " 687 TR. .. | 0.2 | " | " 690 .. | 2.6 | Alive |
| " 739 TR. .. | 0.4 | Dead | " 704 .. | 1.4 | " |
| " 898 TB. .. | 11.5 | " | " 834 .. | 1.0 | " |
| " 900 TB. .. | 2.3 | Alive | " 902 .. | 2.0 | Dead |
| ONDERSTEEPOORT STRAIN I. | | | | | |
| Dog 795 TR. .. | 1.1 | Dead | Dog 794 .. | 5.2 | Dead |
| " 799 TR. .. | 0.5 | " | " 805 .. | 0.4 | " |
| " 786 TR. .. | 1.0 | " | " 798 .. | 3.0 | " |
| ONDERSTEEPOORT STRAIN II. | | | | | |
| Dog 840 TR. .. | 3.0 | Dead | Dog 835 .. | 4.0 | Dead |
| " 842 TR. .. | 1.1 | " | " 841 .. | 10.7 | " |
| " 846 TR. .. | 19.6 | " | " 836 .. | 70.1 | " |
| " 848 TR. .. | (4.6) | " | " 844 .. | 14.0 | " |
| " 845 Egr. .. | 1.4 | Alive | " 847 .. | 19.8 | " |
| " 875 TB. .. | 8.2 | " | " 872 .. | 7.2 | " |
| " 878 TB. .. | 3.2 | " | " 873 .. | 2.0 | " |
| | | | " 874 .. | 2.5 | " |
| | | | " 876 .. | 2.0 | " |
| | | | " 896 .. | 5.4 | " |

* Not in the records of experiments.

RECORDS OF EXPERIMENTS.

A.—PRETORIA STRAIN.

DOG No. I.—TRYPAN-RED TREATMENT: One Injection of 1 per cent. Solution.

Dog 665. 6.75 lb. 25th September, 1909. *Injected subcutaneously 5 c.c. blood of dog (Mr. Gray).*

| Day. | Date. | Time. | Temperature. | | Red Blood Corp. Infected. | The Infected Red Blood Corpuscles contained Parasites as follows:— | | | | | | | | | | |
|------|-------|-------|--------------|----|---------------------------|--|---|-----|-----|-------|------|-----|--------|-----|-----|---|
| | | | M. | E. | | P. | O. | D. | PP. | PPPP. | OOO. | OO. | PPPPP. | | | |
| | | | | | % | % | % | % | % | % | % | % | % | % | % | |
| 9 | Oct. | 4 | — | — | 102 | 102 ² | 0.1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | " | 5 | — | — | 104 | 105 ⁶ | 0.1 | | | | | | | | | |
| 11 | " | 6 | — | — | 103 | 103 ⁶ | 1.2 | 0.1 | 0.2 | 0.4 | 0.5 | 0 | 0 | 0 | 0 | 0 |
| 12 | " | 7 | — | — | 104 | 102 ⁴ | 5.8 | 1.0 | 1.8 | 1.0 | 1.6 | 0.2 | 0.2 | 0 | 0 | 0 |
| 12 | " | 7 | 12 o'clock | — | — | — | <i>Injected with 5 c.c. Trypan-red Solution, 1 per cent.</i> | | | | | | | | | |
| 12 | " | 7 | 2 " | — | — | 11.0 | 1.8 | 1.4 | 3.2 | 4.4 | 0.2 | 0 | 0 | 0 | 0 | 0 |
| 12 | " | 7 | 4 " | — | — | 9.8 | 0.6 | 0 | 2.0 | 6.4 | 0.6 | 0 | 0.2 | 0 | 0.2 | 0 |
| 12 | " | 7 | — | — | — | — | <i>Slight red injection of mucous membranes.</i> | | | | | | | | | |
| 12 | " | 7 | 6 " | — | — | 0.6 | 0.1 | 0.4 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | " | 7 | — | — | — | — | <i>Distinct injection of the membranes.</i> | | | | | | | | | |
| 12 | " | 7 | 8 " | — | — | 2.6 | 0 | 1.6 | 0 | 1.0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | " | 7 | 10 " | — | — | 6.4 | 0.2 | 0.4 | 3.0 | 2.4 | 0.2 | 0 | 0 | 0 | 0.2 | 0 |
| 12 | " | 7 | 12 " | — | — | 5.6 | 0 | 1.8 | 1.8 | 1.8 | 0.2 | 0 | 0 | 0 | 0 | 0 |
| 13 | " | 8 | 6 " | — | 104 ⁸ | 103 ² | 8.2 | 0.4 | 3.6 | 1.2 | 2.6 | 0 | 0 | 0.4 | 0 | 0 |
| 13 | " | 8 | 8 " | — | — | — | 6.0 | 1.6 | 0.4 | 2.4 | 1.4 | 0 | 0 | 0.2 | 0 | 0 |
| 13 | " | 8 | 11 " | — | — | — | 8.0 | 2.0 | 1.0 | 3.2 | 1.6 | 0 | 0 | 0.2 | 0 | 0 |
| 14 | " | 9 | 9.30 " | — | 104 | 103 | 4.8 | 0.6 | 1.2 | 1.0 | 1.8 | 0.2 | 0 | 0 | 0 | 0 |
| 15 | " | 10 | — | — | 100 | — | <i>*Dog found dead. Typical piroplasmiasis. Spleen enlarged. Piroplasms present in all organs. Red injection of the serous membranes and especially the intestines.</i> | | | | | | | | | |

DOG No. II.—TRYPAN-RED TREATMENT: Two Injections of 1 per cent. Solution.

Dog 666. 25th September, 1909. *Injected subcutaneously 5 c.c. blood of dog (Mr. Gray).*

| Day. | Date. | Time. | Temperature. | | Red Blood Corp. Infected. | The Infected Red Blood Corpuscles contained Parasites as follows:— | | | | | | | | | | |
|------|-------|-------|--------------|----|---------------------------|--|---|-----|-----|-------|------|-----|-----|-----|-----|---|
| | | | M. | E. | | P. | D. | O. | PP. | PPPP. | OOO. | OO. | PS. | | | |
| | | | | | % | % | % | % | % | % | % | % | % | % | | |
| 9 | Oct. | 4 | 4.30 o'clock | — | 104 | 103 ⁴ | 5.4 | 0.6 | 0.9 | 1.7 | 1.7 | 0.3 | 0 | 0.3 | 0 | 0 |
| 10 | " | 5 | 9.30 " | — | 103 | 104 | 0.2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | " | 6 | 9.30 " | — | 103 ⁴ | 104 ⁴ | 8.2 | 1.0 | 1.0 | 2.8 | 2.2 | 1.2 | 0 | 0 | 0 | 0 |
| 12 | " | 7 | 9.30 " | — | 104 | 103 | 7.0 | 1.6 | 1.6 | 1.8 | 1.8 | 0.2 | 0 | 0 | 0 | 0 |
| 12 | " | 7 | 12 " | — | — | — | <i>Treatment: Injected subcutaneously 7 c.c. Trypan-red Solution, 1 per cent.</i> | | | | | | | | | |
| 12 | " | 7 | 2 " | — | — | — | <i>Mucous membranes pale.</i> | | | | | | | | | |
| 12 | " | 7 | 4 " | — | — | — | 5.2 | 1.4 | 0.6 | 1.0 | 2.2 | 0 | 0 | 0 | 0 | 0 |
| 12 | " | 7 | 4 " | — | — | — | 12.4 | 1.2 | 4.0 | 1.4 | 4.6 | 0 | 0 | 0 | 0.2 | 0 |
| 12 | " | 7 | 6 " | — | — | — | <i>Slight reddish injection of mucous membranes.</i> | | | | | | | | | |
| 12 | " | 7 | 6 " | — | — | — | 2.4 | 0.6 | 0.6 | 0.6 | 0.4 | 0.2 | 0 | 0 | 0 | 0 |
| 12 | " | 7 | 8 " | — | — | — | <i>Injection distinct.</i> | | | | | | | | | |
| 12 | " | 7 | 8 " | — | — | — | 0.8 | 0.2 | 0 | 0.4 | 0.2 | 0 | 0 | 0 | 0 | 0 |
| 12 | " | 7 | 10 " | — | — | — | 0.2 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | " | 7 | 12 " | — | — | — | 2.2 | 0.4 | 0.4 | 0.8 | 0.6 | 0 | 0 | 0 | 0 | 0 |
| 13 | " | 8 | 6 " | — | 102 ⁶ | 102 ⁴ | 1.4 | 0.4 | 0.2 | 0.2 | 0.6 | 0 | 0 | 0 | 0 | 0 |
| 13 | " | 8 | 8 " | — | — | — | 2.0 | 0 | 0.6 | 0.2 | 0.8 | 0.2 | 0 | 0.2 | 0 | 0 |
| 13 | " | 8 | 10 " | — | — | — | <i>Treatment: Injected subcutaneously 5 c.c. Trypan-red Solution, 1 per cent.</i> | | | | | | | | | |
| 13 | " | 8 | 4 " | — | — | — | 0.6 | 0 | 0 | 0.2 | 0.4 | 0 | 0 | 0 | 0 | 0 |
| 14 | " | 9 | 10 " | — | 100 ⁸ | 101 | 0.2 | 0 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0 |
| 15 | " | 10 | — | — | 100 ⁸ | 102 ⁸ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | " | 11 | 12 " | — | 99 ⁸ | 102 | <i>Red injection of mucous membranes distinct.</i> | | | | | | | | | |

| Day. | Date. | Time. | Temperature. | | Red Blood Corp. infected. | The Infected Red Blood Corpuscles contained Parasites as follows:— | | | | | | | |
|-------|---------|------------|--|------------------|---------------------------|--|-----|-----|-----|-------|------|-----|-----|
| | | | | | | P. | D. | O. | PP. | PPPP. | OOO. | OO. | PS. |
| 1909. | | | M. | E. | % | % | % | % | % | % | % | % | % |
| 16 | Oct. 11 | 10 o'clock | — | — | 0.2 | 0 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 |
| 17 | " 12 | 10 " | 99 ^s | 101 ⁴ | 0 | | | | | | | | |
| 18 | " 13 | — | 100 ⁴ | 101 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19 | " 14 | — | 101 ² | 101 ² | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 | " 15 | — | 102 | 102 | 0.1 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 |
| 21 | " 16 | — | 101 ² | 103 ^s | 0.2 | 0 | 0.1 | 0 | 0 | 0.1 | 0 | 0 | 0 |
| 22 | " 17 | — | 102 ⁴ | 102 ^s | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | " 18 | — | 103 | 101 ⁶ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | " 19 | — | 103 | 103 | 0.2 | 0 | 0.1 | 0 | 0.1 | 0 | 0 | 0 | 0 |
| 25 | " 20 | — | 102 | 102 | 0.1 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 |
| 26 | " 21 | — | 102 | 101 ⁴ | 0.3 | 0.2 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 |
| 27 | " 22 | — | 102 | 102 | 0.4 | 0.1 | 0 | 0.1 | 0.2 | 0 | 0 | 0 | 0 |
| 28 | " 23 | — | 98 ^s | 101 ⁶ | 0.7 | 0 | 0 | 0.4 | 0.1 | 0 | 0 | 0.2 | 0 |
| 29 | " 24 | — | 100 ² | 102 ^s | 2.4 | 0.6 | 0.3 | 0.5 | 0.8 | 0 | 0 | 0.2 | 0 |
| 30 | " 25 | — | 101 ⁶ | — | 0.1 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 |
| 30 | " 25 | — | Dog found dead. <i>Chronic piroplasmosis</i> . Piroplasms found in heart, blood, and other organs. Red discolouration of all internal organs and mucous membranes. | | | | | | | | | | |

CONTROL DOG NO. I.—EXPERIMENT NO. I.

Dog 667. 16.5 lb. 25th September, 1909. *Injected subcutaneously 5 c.c. blood of dog (Mr. Gray).*

| Day. | Date. | Time. | Temperature. | | Red Blood Corp. Infected. | The Infected Red Blood Corpuscles contained Parasites as follows:— | | | | | | | |
|-------|--------|-----------------|---|------------------|---------------------------|--|-----|-----|-----|-------|------|-----|-----|
| | | | | | | P. | D. | O. | PP. | PPPP. | OOO. | OO. | PS. |
| 1909. | | | M. | E. | % | % | % | % | % | % | % | % | % |
| 9 | Oct. 4 | — | 104 ⁶ | 104 | 1.5 | 0.2 | 0.3 | 0.7 | 0.3 | 0 | 0 | 0 | 0 |
| 10 | " 5 | — | 103 | 103 ^s | 0.2 | 1.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | " 6 | — | 100 ^s | 103 | 0.6 | 0.3 | 0.2 | 0.1 | 0 | 0 | 0 | 0 | 0 |
| 12 | " 7 | 9.30 o'clock | 103 | 101 ⁴ | 2.3 | 0.3 | 0.9 | 0.2 | 0.2 | 0.2 | 0 | 0 | 0 |
| 12 | " 7 | 2 " | — | — | 0.2 | 0 | 0 | 0.1 | 0.1 | 0 | 0 | 0 | 0 |
| 12 | " 7 | 4 " | — | — | 0.7 | 0.2 | 0.1 | 0.3 | 0.1 | 0 | 0 | 0 | 0 |
| 12 | " 7 | 6 " | — | — | 0.2 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0 |
| 13 | " 8 | 6 " | 103 ^s | 102 ⁴ | 1.8 | 0 | 0.2 | 1.0 | 0.5 | 0.1 | 0 | 0 | 0 |
| 13 | " 8 | 8 " | — | — | 5.6 | 0.4 | 0.8 | 3.4 | 1.0 | 0 | 0 | 0 | 0 |
| 13 | " 8 | 10 " | — | — | 1.6 | 0.8 | 0 | 0.2 | 0.6 | 0 | 0 | 0 | 0 |
| 14 | " 9 | 10 " | 103 | 102 | 13.0 | 0.8 | 3.0 | 5.2 | 3.0 | 0.2 | 0.4 | 0.4 | 0.4 |
| 15 | " 10 | 10 " | 103 | 104 | 15.4 | 1.4 | 4.0 | 4.6 | 4.0 | 1.2 | 0 | 0.2 | 0.2 |
| 16 | " 11 | Dog found dead. | Piroplasms found in heart, blood, and other organs. | | | | | | | | | | |

B.—JOHANNESBURG STRAIN.

DOG NO. III.—TRYPAN-RED TREATMENT: Two Injections of 1 per cent. Solution, 14 c.c.

Dog 653. 6.2 lb. 5th October, 1909. *Injected subcutaneously 2 c.c. blood of dog 669.*

| Day. | Date. | Time. | Temperature. | | Red Blood Corp. Infected. | The Infected Red Blood Corpuscles contained Parasites as follows:— | | | | | | | |
|-------|---------|------------|--|-----|---------------------------|--|-----|-----|-----|-------|-----|--|--|
| | | | | | | P. | PP. | O. | D. | PPPP. | OO. | | |
| 1909. | | | M. | E. | % | % | % | % | % | % | | | |
| 5 | Oct. 10 | 10 o'clock | 103 | 105 | 0.1 | 0 | 0 | 0.1 | 0 | 0 | 0 | | |
| 6 | " 11 | 10 " | 103 ⁴ | 105 | 4.3 | 1.0 | 0.8 | 0.8 | 1.3 | 0.4 | 0 | | |
| 6 | " 11 | 12.15 " | <i>Injected subcutaneously 7 c.c. Trypan-red Solution, 1 per cent.</i> | | | | | | | | | | |
| 6 | " 11 | 2 " | — | — | 12.2 | 1.4 | 4.0 | 4.6 | 1.8 | 0.2 | 0.2 | | |

| Day. | Date. | Time. | Temperature. | | Red Blood Corp. infected. | The Infected Red Blood Corpuscles contained Parasites as follows:— | | | | | | |
|------|---------|-----------|--|------------------|---------------------------|--|-----|-----|-----|-------|-----|---|
| | | | M. | E. | | P. | PP. | O. | D. | PPPP. | OO. | |
| | | | | | | % | % | % | % | % | % | % |
| 6 | 1909. | | | | | | | | | | | |
| 6 | Oct. 11 | 4 o'clock | — | — | 6.6 | 0.7 | 1.4 | 2.3 | 2.0 | 0 | 0.2 | |
| 6 | " 11 | 6 " | — | — | 0.9 | 0.2 | 0.2 | 0.2 | 0.3 | 0 | 0 | |
| 6 | " 11 | 8 " | — | — | 0.3 | 0 | 0 | 0.2 | 0.1 | 0 | 0 | |
| 6 | " 11 | 10 " | — | — | 0.8 | 0.2 | 0.1 | 0.1 | 0.4 | 0 | 0 | |
| 6 | " 11 | 11.30 " | — | — | 1.7 | 0.2 | 0.2 | 0.8 | 0.5 | 0 | 0 | |
| 7 | " 12 | 9.30 " | 102 ⁶ | 103 ⁸ | 4.0 | 1.6 | 0.3 | 0.5 | 1.5 | 0 | 0.1 | |
| 7 | " 12 | 2 " | — | — | 8.4 | 2.4 | 3.7 | 1.4 | 0.7 | 0.2 | 0 | |
| 7 | " 12 | 4 " | — | — | 1.3 | 0.3 | 0.4 | 0.1 | 0.5 | 0 | 0 | |
| 8 | " 13 | 10 " | 103 | 104 ² | 3.4 | 0 | 1.6 | 1.3 | 0.3 | 0.1 | 0.1 | |
| 9 | " 14 | 9 a.m. | 102 ⁶ | 102 ⁶ | 0.2 | 0.1 | 0.1 | 0 | 0 | 0 | 0 | |
| 9 | " 14 | — | Dog very weak; an abscess formed where the first injection was made. Slight red injection of the mucous membranes. | | | | | | | | | |
| 9 | " 14 | 9.50 a.m. | <i>Injected subcutaneously 7 c.c. Trypan-red Solution at two places.</i> | | | | | | | | | |
| 9 | " 14 | 4.30 p.m. | — | — | 1.5 | 0.1 | 0.6 | 0.5 | 0.3 | 0 | 0 | |
| 10 | " 15 | 10 a.m. | 101 ⁴ | — | 1.3 | 0 | 0.7 | 0 | 0.5 | 0.1 | 0 | |
| 10 | " 15 | 3.30 p.m. | * Dog found dead. Typical piroplasmosis; parasites present in all organs. Two large abscesses at the seat of the injection with a white-reddish pus. All organs dark reddish discoloured. Spleen 13 × 14½. | | | | | | | | | |

DOG NO. IV.—TRYPAN-RED TREATMENT: Two Injections of 1 per cent. Solution (one injection intravenously), 15 c.c.

Dog 660. 10 lb. 5th October, 1909. *Injected subcutaneously 0.25 c.c. blood of dog 669.*

| Day. | Date. | Time. | Temperature. | | Red Blood Corp. Infected. | The Infected Red Blood Corpuscles contained Parasites as follows:— | | | | | | |
|------|---------|------------|------------------|------------------|--|--|-----|-----|-----|-------|-----|-----|
| | | | M. | E. | | P. | PP. | O. | D. | PPPP. | OO. | |
| | | | | | | % | % | % | % | % | % | % |
| 5 | 1909. | | | | | | | | | | | |
| 5 | Oct. 10 | 10 o'clock | 104 | 104 | 0.1 | 0 | 0.1 | 0 | 0 | 0 | 0 | |
| 6 | " 11 | 10 " | 103 | 101 ² | 0.3 | 0 | 0.1 | 0.1 | 0 | 0 | 0 | |
| 6 | " 11 | 12 " | — | — | <i>Injected subcutaneously 8 c.c. Trypan-red Solution, 1 per cent.</i> | | | | | | | |
| 6 | " 11 | 2 " | — | — | 0.1 | 0 | 0.1 | 0 | 0 | 0 | 0 | |
| 6 | " 11 | 4 " | — | — | 0.1 | | | | | | | |
| 6 | " 11 | 6 " | — | — | 0.1 | | | | | | | |
| 6 | " 11 | 8 " | — | — | 0.1 | | | | | | | |
| 6 | " 11 | 10 " | — | — | 0.3 | 0 | 0.1 | 0.1 | 0.1 | 0 | 0 | |
| 6 | " 11 | 11.30 " | — | — | 0.1 | 0 | 0.1 | 0 | 0 | 0 | 0 | |
| 7 | " 12 | 7 " | 104 | 103 ⁸ | 1.4 | 0.3 | 0.3 | 0 | 0.2 | 0 | 0.5 | 0.1 |
| 7 | " 12 | 2 p.m. | — | — | 0.1 | 0.1 | 0 | 0 | 0 | 0 | 0 | |
| 7 | " 12 | 4 p.m. | — | — | 0.1 | 0 | 0.1 | 0 | 0 | 0 | 0 | |
| 8 | " 13 | 10 a.m. | 103 ² | 104 ⁴ | 0.1 | 0 | 0 | 0.1 | 0 | 0 | 0 | |
| 9 | " 14 | — | 104 | 103 ⁶ | 0.1 | 0 | 0.1 | 0 | 0 | 0 | 0 | |
| 10 | " 15 | — | 103 | 105 ² | 4.8 | 0.9 | 1.4 | 1.0 | 1.2 | 0.2 | 0.1 | |
| 11 | " 16 | — | 103 ⁴ | 102 ⁴ | 9.5 | 0.7 | 3.7 | 2.7 | 1.6 | 0.1 | 0.6 | 0.1 |
| 12 | " 17 | — | 101 ⁴ | 103 | 6.0 | 0.9 | 1.6 | 2.4 | 0.5 | 0 | 0.6 | 0 |
| 13 | " 18 | 9 a.m. | 102 | 102 ² | 17.6 | 2.6 | 8.2 | 3.0 | 3.4 | 0.2 | 0.2 | |
| 13 | " 18 | 11 a.m. | — | — | <i>Injected intrajugularly 7 c.c. Trypan-red Solution.</i> | | | | | | | |
| 13 | " 18 | 12 noon | — | — | 0.1 | 0.1 | 0 | 0 | 0 | 0 | 0 | |
| 13 | " 18 | 2 p.m. | — | — | 4.2 | 0.3 | 0.7 | 1.1 | 2.0 | 0 | 0.1 | 0 |
| 13 | " 18 | 4 p.m. | — | — | 2.2 | 0.1 | 0.5 | 0.8 | 0.7 | 0.1 | 0 | 0 |
| 13 | " 18 | 11 p.m. | — | — | 0.8 | 0.1 | 0.2 | 0.3 | 0.2 | 0 | 0 | 0 |
| 14 | " 19 | 7 a.m. | — | — | Dog found dead. Piroplasmosis, with slight haemoglobinuria. Signs of intoxication. Spleen enlarged, 22½ × 6½ cm. | | | | | | | |

DOG No. V.—TRYPAN-RED TREATMENT: One Injection Intravenously (7 c.c.).

Dog 624. 10.2 lb. 13th October, 1909. *Injected subcutaneously 3 c.c. blood of dog 670.*

(Rather advanced case.)

| Day. | Date. | Time. | Tempera- ture. | | Red Blood Corp. In- fected. | The Infected Red Blood Corpuscles contained Parasites as follows:— | | | | | | |
|------|---------|------------|-------------------|------------------|--|---|-----|-----|-----|-------|-----|------|
| | | | M. | E. | | P. | PP. | D. | O. | PPPP. | OO. | OPP. |
| | 1909. | | | | % | % | % | % | % | % | % | % |
| 4 | Oct. 17 | 9 o'clock | 101 ⁶ | 103 ² | 0.8 | 0 | 0.2 | 0 | 0.6 | 0 | 0 | 0 |
| 5 | " 18 | 10 " | 104 ² | 103 ² | 4.5 | 0.3 | 0 | 0.5 | 3.4 | 0 | 0.3 | 0 |
| 6 | " 19 | 7 a.m. | 102 ³ | | 20.2 | 5.4 | 2.0 | 7.0 | 5.8 | 0 | 0 | 0 |
| 6 | " 19 | 9 a.m. | — | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | " 19 | 10 a.m. | — | | 8.6 | 0.4 | 1.0 | 0.2 | 6.6 | 0 | 0.2 | 0.2 |
| 6 | " 19 | 10 a.m. | — | | <i>Injected intrajugularly 7 c.c. Trypan-red Solution, 1 per cent.</i> | | | | | | | |
| | | | | | Dog slightly collapsed after injection. | | | | | | | |
| 6 | " 19 | 10.20 a.m. | — | | Mucous membranes reddish; respiration hurried. | | | | | | | |
| | | | | | Symptoms of intoxication. | | | | | | | |
| 6 | " 19 | 11 a.m. | — | | 18.4 | 4.6 | 2.6 | 2.8 | 8.0 | 0.2 | 0.2 | 0 |
| | | | | | Similar symptoms, very weak. Trembling of the muscles. | | | | | | | |
| 6 | " 19 | 11.15 a.m. | — | | Passes red urine, with blood and albumine. | | | | | | | |
| 6 | " 19 | 11.20 a.m. | — | | Dog found dead. Acute piroplasmosis. | | | | | | | |

DOG No. VII.—TRYPAN-RED TREATMENT: Three Injections of 1 per cent. Solution (32 c.c.).

Dog 735. 22 lb. 19th October, 1909. *Injected subcutaneously 2 c.c. blood of dog 673.*

| Day. | Date. | Time. | Tempera- ture. | | Red Blood Corp. In- fected. | The Infected Red Blood Corpuscles contained Parasites as follows:— | | | | | |
|------|---------|------------|-------------------|------------------|--|---|------|------|-----|-------|-----|
| | | | M. | E. | | P. | PP. | O. | D. | PPPP. | OO. |
| | 1909. | | | | % | % | % | % | % | % | % |
| 4 | Oct. 23 | 10 a.m. | 105 | 105 ² | >0.1 | 0 | 0 | >0.1 | 0 | 0 | 0 |
| 5 | " 24 | 10 a.m. | 103 ⁴ | 103 ⁴ | >0.1 | 0 | 0 | >0.1 | 0 | 0 | 0 |
| 6 | " 25 | 10 a.m. | 104 | 105 | 0.3 | 0.1 | 0.1 | 0.1 | 0 | 0 | 0 |
| 6 | " 25 | 10.45 a.m. | — | | <i>Injected subcutaneously 7 c.c. Trypan-red Solution, 1 per cent. subcutaneously at several places.</i> | | | | | | |
| 6 | " 25 | 12.45 p.m. | — | | 0.2 | 0 | 0.1 | 0.1 | 0 | 0 | 0 |
| 6 | " 25 | 2.30 p.m. | — | | >0.1 | 0 | 0 | >0.1 | 0 | 0 | 0 |
| 6 | " 25 | 4.30 p.m. | — | | 0.3 | 0 | 0.2 | 0 | 0.1 | 0 | 0 |
| 6 | " 25 | 6.30 p.m. | — | | 0.3 | 0.1 | 0 | 0 | 0.2 | 0 | 0 |
| 6 | " 25 | 8.30 p.m. | — | | 0.7 | 0.1 | 0.3 | 0.2 | 0.1 | 0 | 0 |
| 6 | " 25 | 10.30 p.m. | — | | >0.1 | 0 | >0.1 | 0 | 0 | 0 | 0 |
| 7 | " 26 | 7 a.m. | 103 ⁴ | 104 ⁴ | 0.3 | 0 | 0.1 | 0.1 | 0.1 | 0 | 0 |
| 7 | " 26 | 10 a.m. | — | | 0.2 | 0 | 0.2 | | | | |
| 7 | " 26 | 4 p.m. | — | | Slight red injection. <i>Injected subcutaneously 15 c.c. Trypan-red Solution, 1 per cent.</i> | | | | | | |
| 8 | " 27 | 10 a.m. | 103 ² | 103 ² | 0.6 | 0.1 | 0.3 | 0.2 | 0 | 0 | 0 |
| 9 | " 28 | 10 a.m. | 100 ⁸ | 103 ⁶ | 0.8 | 0.8 | 0.3 | 0 | 0.4 | 0 | 0 |
| 9 | " 28 | 3 p.m. | — | | M.M., skin, strong red injection. | | | | | | |
| 10 | " 29 | 10 a.m. | 102 ⁶ | 102 ² | 1.8 | 0.2 | 0.6 | 0.6 | 0.4 | 0 | 0 |
| 11 | " 30 | 10 a.m. | 102 ² | 103 | >0.1 | | | >0.1 | | 0 | 0 |
| 12 | " 31 | 10 a.m. | 103 | 103 | 2.3 | 0.1 | 0.9 | 0.3 | 0.1 | 0 | 0 |
| 13 | Nov. 1 | 10 a.m. | 104 | 102 ^c | 2.5 | 0 | 1.0 | 0.2 | 1.3 | 0 | 0 |
| 14 | " 2 | 10 a.m. | 103 | 102 ⁸ | | | | | | | |
| 15 | " 3 | 10 a.m. | 102 ⁴ | 102 ⁴ | 2.3 | 0.2 | 0.9 | 0.7 | 0.5 | 0 | 0 |
| 15 | " 3 | 5 p.m. | — | | (Decubitus.) <i>Injected subcutaneously 10 c.c. Trypan-red Solution, 1 per cent.</i> | | | | | | |
| 16 | " 4 | 10 a.m. | 101 | 102 ⁶ | 10.6 | 1.2 | 2.0 | 2.2 | 5.0 | 0.2 | |
| 17 | " 5 | 10 a.m. | 101 ⁸ | 102 ² | 14.2 | 1.8 | 5.4 | 4.6 | 2.4 | | |
| 18 | " 6 | — | — | | Dog found dead. Typical piroplasmosis, parasites present in all organs; haemoglobinuria; spleen: 21½ × 9½ × 5 cm.; cell organs dark reddish discoloured. | | | | | | |

DOG NO. VIII.—TRYPAN-RED TREATMENT: Three Injections of 1 per cent. Trypan-red Solution (22 c.c.).

Dog 738. 14.5 lb. 19th October, 1909. *Injected subcutaneously 2 c.c. blood of dog 673.*

| Day. | Date. | Time. | Tempera- ture. | | Red Blood Corp. In- fected. | The Infected Red Blood Corpuscles contained Parasites as follows:— | | | | | |
|-------|---------|------------|-------------------|------------------|--|---|------|------|-----|-------|-----|
| | | | M. | E. | | P. | PP. | O. | D. | PPPP. | OO. |
| 1909. | | | % | % | % | % | % | % | % | % | % |
| 4 | Oct. 23 | 10 a.m. | 105 | 104 ⁸ | >0.1 | 0 | 0 | >0.1 | 0 | 0 | 0 |
| 5 | " 24 | 10 a.m. | 103 ² | 105 ² | 1.1 | 0 | 0.5 | 0.6 | 0 | 0 | 0 |
| 6 | " 25 | 10 a.m. | 103 | 103 | 0.2 | 0 | 0.2 | 0 | 0 | 0 | 0 |
| 6 | " 25 | 10.45 a.m. | — | — | <i>Injected subcutaneously 7 c.c. Trypan-red Solution, 1 per cent.</i> | | | | | | |
| 6 | " 25 | 12.45 a.m. | — | — | 0.1 | 0 | 0 | 0.1 | 0 | 0 | 0 |
| 6 | " 25 | 2.30 p.m. | — | — | 0.3 | 0 | 0 | 0.1 | 0.2 | 0 | 0 |
| 6 | " 25 | 4.30 p.m. | — | — | 0.1 | 0 | 0 | 0.1 | 0 | 0 | 0 |
| 6 | " 25 | 6.30 p.m. | — | — | 0.2 | 0 | 0 | 0 | 0.2 | 0 | 0 |
| 6 | " 25 | 8.30 p.m. | — | — | 0.1 | 0 | 0.1 | 0 | 0 | 0 | 0 |
| 6 | " 25 | 10.30 p.m. | — | — | 0.6 | 0.1 | 0.1 | 0.1 | 0.3 | 0 | 0 |
| 7 | " 26 | 7 a.m. | 104 | 105 ² | 0.7 | 0.1 | 0.2 | 0.3 | 0 | 0.1 | 0 |
| 7 | " 26 | 10 a.m. | — | — | 1.2 | 0.1 | 0.3 | 0.1 | 0.7 | 0 | 0 |
| 7 | " 26 | 4 p.m. | — | — | <i>Slight red injection. Injected subcutaneously 10 c.c. Trypan-red Solution, 1 per cent.</i> | | | | | | |
| 8 | " 27 | 10 a.m. | 104 ⁶ | 103 ⁶ | >0.1 | 0 | 0 | >0.1 | 0 | 0 | 0 |
| 9 | " 28 | 10 a.m. | 102 | 103 | >0.1 | 0 | >0.1 | 0 | 0 | 0 | 0 |
| 9 | " 28 | 3 p.m. | — | — | <i>M.M. strong reddish injection.</i> | | | | | | |
| 10 | " 29 | 10 a.m. | 103 | 103 ⁸ | 0.2 | 0 | 0.1 | 0.1 | 0 | 0 | 0 |
| 11 | " 30 | 10 a.m. | 103 ² | 102 ⁴ | >0.1 | 0 | >0.1 | 0 | 0 | 0 | 0 |
| 12 | " 31 | 10 a.m. | 101 ⁶ | 101 ⁸ | 0.1 | 0 | 0.1 | 0 | 0 | 0 | 0 |
| 13 | Nov. 1 | 10 a.m. | 103 | 103 | 3.4 | 0.2 | 1.2 | 0.6 | 1.2 | 0.2 | 0 |
| 14 | " 2 | 10 a.m. | 103 | 103 | >0.1 | 0 | >0.1 | 0 | 0 | 0 | 0 |
| 15 | " 3 | 10 a.m. | 103 | 99 ⁸ | 2.4 | 0 | 1.2 | 0.8 | 0.4 | 0 | 0 |
| 15 | " 3 | 5 p.m. | — | — | <i>Injected subcutaneously 5 c.c. Trypan-red Solution, 1 per cent.</i> | | | | | | |
| 16 | " 4 | 10 a.m. | 101 ⁴ | 102 | >0.1 | 0 | >0.1 | 0 | 0 | 0 | 0 |
| 17 | " 5 | 10 a.m. | 101 | 104 | 2.0 | 0 | 0.6 | 0.5 | 0.4 | 0.4 | 0.1 |
| 18 | " 6 | — | 102 | — | <i>Dog found dead. Typical piroplasmis; spleen: enlarged, 18 × 8 × 4 c.m.; parasites present in all organs. All organs dark red.</i> | | | | | | |

DOG NO. XI.—TRYPAN-RED TREATMENT: One Injection of Trypan-red.

Dog 744. Very old fox terrier; good condition. 19th October, 1909. *Injected subcutaneously 2 c.c. blood of dog 673.*

| Day. | Date. | Time. | Tempera- ture. | | Red Blood Corp. In- fected. | The Infected Red Blood Corpuscles contained Parasites as follows:— | | | | | |
|-------|---------|---------|-------------------|------------------|--|---|-----|-----|-----|-------|-----|
| | | | M. | E. | | P. | PP. | O. | D. | PPPP. | OO. |
| 1909. | | | % | % | % | % | % | % | % | % | % |
| 6 | Oct. 25 | 10 a.m. | 104 ⁶ | 104 ⁶ | 7.9 | 0.2 | 1.7 | 1.2 | 4.7 | 0.1 | 0 |
| 7 | " 26 | 10 a.m. | 104 | 103 ⁴ | 9.6 | 1.6 | 2.4 | 1.4 | 4.4 | 0 | 0 |
| 7 | " 26 | 4 p.m. | — | — | <i>Rather sick; m.m. pale. Injected subcutaneously 10 c.c. Trypan-red, 1 per cent. Solution.</i> | | | | | | |
| 8 | " 27 | — | 100 ⁶ | — | <i>Dog found dead. Typical piroplasmis; parasites present in all organs. Red discolouration of the serous membranes.</i> | | | | | | |

DOG NO. XII.—TRYPAN-RED TREATMENT: One Injection of 1 per cent. Trypan-red.

Dog 752. Mongrel. Fair condition. 8.5 lb. 19th October, 1909. *Injected subcutaneously blood of dog 673.*

| Day. | Date. | Time. | Tempera- ture. | | Red Blood Corp. In- fected. | The Infected Red Blood Corpuscles contained Parasites as follows:— | | | | | |
|-------|---------|---------|-------------------|------------------|--------------------------------------|---|------|----|-----|-------|-----|
| | | | M. | E. | | P. | PP. | O. | D. | PPPP. | OO. |
| 1909. | | | % | % | % | % | % | % | % | % | % |
| 5 | Oct. 24 | 10 a.m. | 102 ⁴ | 105 ² | >0.1 | 0 | >0.1 | 0 | 0 | 0 | 0 |
| 6 | " 25 | 10 a.m. | 103 ⁶ | 105 | >0.1 | 0 | >0.1 | 0 | 0 | 0 | 0 |
| 7 | " 26 | 10 a.m. | 104 ² | 104 ⁴ | 0.3 | 0 | 0 | 0 | 0.3 | 0 | 0 |

| Day. | Date. | Time. | Temperature. | | Corp. Infected. | The Infected Red Blood Corpuscles contained Parasites as follows:— | | | | | |
|------|------------------|---------|------------------|------------------|--|--|----------------|-----|------|-------------|-----------------------|
| | | | M. | E. | | P. | PP. | O. | D. | PPPP. | OO. |
| 7 | 1909. Oct. 26 | 4 p.m. | — | — | Sick. | Injected | subcutaneously | 6 | c.c. | Trypan-red, | 1 per cent. Solution. |
| 8 | " 27 | 10 a.m. | 104 ⁶ | 103 ² | 0.1 | 0 | >0.1 | 0 | 0 | 0 | 0 |
| 9 | " 28 | 10 a.m. | 101 ⁶ | 104 ⁴ | 0.1 | 0 | 0 | 0 | >0.1 | 0 | 0 |
| 9 | " 28 | 3 p.m. | — | — | M.M., skin, reddish injection. (Dog weak.) | | | | | | |
| 10 | " 29 | 10 a.m. | 103 ² | 103 ² | 1.2 | 0 | 0.4 | 0.5 | 0.3 | 0 | 0 |
| 11 | " 30 | 10 a.m. | 101 ³ | 101 | 1.4 | 0 | 0.8 | 0.4 | 0.2 | 0 | 0 |
| 12 | " 31 | 10 a.m. | 101 ² | 103 ⁶ | 1.4 | 0.4 | 0.6 | 0 | 0.4 | 0 | 0 |
| 13 | Nov. 1 | 10 a.m. | 101 ⁴ | 103 ⁶ | 2.2 | 0.3 | 0.9 | 0.4 | 0.4 | 0.1 | 0.1 |
| 14 | " 2 | — | 100 ⁸ | — | Dog found dead. Typical piroplasmosis; parasites present in all organs; spleen: $19 \times 3\frac{1}{2}$; haemoglobinuria. All internal organs dark red; skin and serous membranes especially dark red. | | | | | | |

DOG NO. XIII.—TRYPAN-RED TREATMENT: One Injection of Trypan-red Solution.

Dog 756. Mongrel; fair condition. 12 lb. 19th October, 1909. *Injected subcutaneously 2 c.c. blood of dog 673.*

| Day. | Date. | Time. | Temperature. | | Corp. Infected. | The Infected Red Blood Corpuscles contained Parasites as follows:— | | | | | |
|------|------------------|---------|------------------|------------------|---|--|------|-----|------|-------|-----|
| | | | M. | E. | | P. | PP. | O. | D. | PPPP. | OO. |
| 7 | 1909. Oct. 26 | 10 a.m. | 104 ⁸ | 105 | 5.2 | 0.6 | 0.5 | 1.6 | 2.5 | 0 | 0 |
| 7 | " 26 | 4 p.m. | — | — | M.M. pale. <i>Injected subcutaneously 8 c.c. Trypan-red,</i> <i>1 per cent. Solution.</i> | | | | | | |
| 8 | " 27 | 10 a.m. | 105 | 103 ⁶ | >0.1 | 0 | 0 | 0 | >0.1 | 0 | 0 |
| 9 | " 28 | 10 a.m. | 101 ² | 101 ⁸ | >0.1 | 0 | >0.1 | 0 | 0 | 0 | 0 |
| 9 | " 28 | 3 p.m. | — | — | M.M. strong reddish injection. | | | | | | |
| 10 | " 29 | 10 a.m. | 101 ⁶ | 101 ⁸ | >0.1 | 0 | >0.1 | 0 | 0 | 0 | 0 |
| 11 | " 30 | 10 a.m. | 102 ⁶ | 103 ⁶ | 2.8 | 0.2 | 1.0 | 0.8 | 0.8 | 0 | 0 |
| 12 | " 31 | 10 a.m. | 101 ⁸ | 102 ⁸ | 1.2 | 0 | 0.3 | 0 | 0.9 | 0 | 0 |
| 13 | Nov. 1 | 10 a.m. | 102 ⁴ | 103 ⁶ | 3.1 | 0 | 1.5 | 0.4 | 1.2 | 0 | 0 |
| 14 | " 2 | 10 a.m. | 100 ⁸ | 103 ² | 2.6 | 0.4 | 1.0 | 0.4 | 0.8 | 0 | 0 |
| 15 | " 3 | 10 a.m. | 101 | — | 2.8 | 0.2 | 1.4 | 0.8 | 0.4 | 0 | 0 |
| 15 | " 3 | 10 a.m. | — | — | Dog found dead. Typical piroplasmosis; haemoglobinuria; spleen: 22×5 c.m.; all organs red. | | | | | | |

DOG NO. XVI.—TRYPAN-RED TREATMENT: One Injection of Trypan-red.
(Recovered.)

Dog 701. Two years old; mongrel; good condition. 1st November, 1909. *Injected subcutaneously 2 c.c. blood of dog 740.*

| Day. | Date. | Time. | Temperature. | | Corp. Infected. | The Infected Red Blood Corpuscles contained Parasites as follows:— | | | | | |
|------|-----------------|---------|------------------|------------------|--|--|-----|-----|-----|-------|-----|
| | | | M. | E. | | P. | PP. | R. | D. | PPPP. | OO. |
| 5 | 1909. Nov. 6 | 10 a.m. | 101 | 102 ⁴ | >0.1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | " 7 | 10 a.m. | 101 | 105 | 0.8 | 0 | 0.2 | 0 | 0.6 | 0 | 0 |
| 7 | " 8 | 10 a.m. | 105 | 106 | 2.1 | 0.3 | 0.5 | 0.6 | 0.7 | 0 | 0 |
| 7 | " 8 | 5 p.m. | — | — | <i>Injected subcutaneously 10 c.c. Trypan-red, 1 per cent. Solution.</i> | | | | | | |
| 8 | " 9 | 10 a.m. | 105 ² | 103 ⁸ | 0.2 | 0 | 0.1 | 0 | 0.1 | 0 | 0 |
| 9 | " 10 | 10 a.m. | 102 ² | 103 ² | 0.2 | 0 | 0 | 0.1 | 0 | 0.1 | 0 |
| 10 | " 11 | 10 a.m. | 102 ⁶ | 102 ² | 0.2 | 0 | 0.1 | 0.1 | 0 | 0 | 0 |
| 11 | " 12 | 10 a.m. | 102 | 103 ⁸ | >0.1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | " 13 | 10 a.m. | 100 | 101 ² | >0.1 | 0 | 0 | 0 | 0 | 0 | 0 |

| Day. | Date. | Time. | Temperature | | Red Blood Corp. In- fected. % | The Infected Red Blood Corpuscles contained Parasites as follows :— | | | | | |
|-------|---------|---------|------------------|------------------|---|--|----------|---------|---------|------------|----------|
| | | | M. | E. | | P. % | PP. % | R. % | D. % | PPPP. % | OO. % |
| 13 | Nov. 14 | 10 a.m. | 100 | 101 ⁶ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 | " 15 | 10 a.m. | 101 ⁴ | 102 ⁸ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | " 16 | 10 a.m. | 102 | 103 ⁶ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | " 17 | 10 a.m. | 103 | 104 ⁶ | >0.1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 | " 18 | 10 a.m. | 103 ² | 102 ⁸ | >0.1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18 | " 19 | 10 a.m. | 100 ⁸ | 102 ² | >0.1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19 | " 20 | 10 a.m. | 102 | 102 ⁶ | 0.4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 | " 21 | 10 a.m. | 101 | 103 ² | 0.2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 | " 22 | 10 a.m. | 101 ⁶ | 102 ⁸ | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 | " 23 | 10 a.m. | 102 | 102 ⁴ | >0.1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | " 24 | 10 a.m. | 101 | 101 ⁴ | >0.1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | " 25 | 10 a.m. | 100 ² | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 | " 26 | 10 a.m. | 100 ⁸ | 102 ² | >0.1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 | " 27 | 10 a.m. | 100 ⁶ | 102 | — | | | | | | |
| 27 | " 28 | 10 a.m. | 101 ⁶ | 102 | — | | | | | | |
| 28 | " 29 | 10 a.m. | 101 | 103 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29 | " 30 | 10 a.m. | 101 | 101 ² | — | | | | | | |
| 30 | Dec. 1 | 10 a.m. | 101 | 101 ⁶ | — | | | | | | |
| 31 | " 2 | 10 a.m. | 100 | 102 ⁶ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 32 | " 3 | 10 a.m. | 100 | 103 ² | — | | | | | | |
| 33 | " 4 | 10 a.m. | 101 | 102 ² | — | | | | | | |
| 34 | " 5 | 10 a.m. | 100 | 101 ² | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 35 | " 6 | 10 a.m. | 99 ⁶ | 102 ² | — | | | | | | |
| 36 | " 7 | 10 a.m. | 103 ² | 103 ⁸ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 37 | " 8 | 10 a.m. | 101 ⁴ | 103 ² | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 38 | " 9 | 10 a.m. | 102 ⁶ | 103 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 39 | " 10 | 10 a.m. | 104 | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 40 | " 11 | 10 a.m. | 100 ⁶ | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 41 | " 12 | 10 a.m. | — | — | — | | | | | | |
| 42 | " 13 | 10 a.m. | — | — | — | | | | | | |
| 43 | " 14 | 10 a.m. | 100 ² | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 44 | " 15 | 10 a.m. | — | — | — | | | | | | |
| 45 | " 16 | 10 a.m. | — | — | — | | | | | | |
| 46 | " 17 | 10 a.m. | 101 | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 47 | " 18 | 10 a.m. | — | — | — | | | | | | |
| 48 | " 19 | 10 a.m. | — | — | — | | | | | | |
| 49 | " 20 | 10 a.m. | 101 | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 50 | " 21 | 10 a.m. | — | — | — | | | | | | |
| 51 | " 22 | 10 a.m. | — | — | — | | | | | | |
| 52 | " 23 | 10 a.m. | 101 ² | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 53 | " 24 | 10 a.m. | — | — | — | | | | | | |
| 54 | " 25 | 10 a.m. | — | — | — | | | | | | |
| 55 | " 26 | 10 a.m. | 102 | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 56 | " 27 | 10 a.m. | — | — | — | | | | | | |
| 57 | " 28 | 10 a.m. | 101 ² | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 58 | " 29 | 10 a.m. | — | — | — | | | | | | |
| 59 | " 30 | 10 a.m. | 101 ⁴ | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 60 | " 31 | 10 a.m. | — | — | — | | | | | | |
| 1910. | | | | | | | | | | | |
| 61 | Jan. 1 | 10 a.m. | — | — | — | | | | | | |
| 62 | " 2 | 10 a.m. | 101 ⁴ | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 63 | " 3 | 10 a.m. | — | — | — | | | | | | |
| 64 | " 4 | 10 a.m. | — | — | — | | | | | | |
| 65 | " 5 | 10 a.m. | 101 | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 66 | " 6 | 10 a.m. | — | — | — | | | | | | |
| 67 | " 7 | 10 a.m. | — | — | — | | | | | | |
| 68 | " 8 | 10 a.m. | 101 ² | — | >0.1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 69 | " 9 | 10 a.m. | — | — | — | | | | | | |
| 70 | " 10 | 10 a.m. | — | — | — | | | | | | |
| 71 | " 11 | 10 a.m. | 101 ⁴ | — | >0.1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 72 | " 12 | 10 a.m. | — | — | — | | | | | | |
| 73 | " 13 | 10 a.m. | — | — | — | | | | | | |
| 74 | " 14 | 10 a.m. | 102 ⁴ | — | — | | | | | | |

DOG NO. XVII.—TRYPAN-RED TREATMENT: One Injection of Trypan-red.

Dog 721. Young mongrel; good condition. 1st November, 1909. *Injected subcutaneously 2 c.c. blood of dog 740.*

| Day. | Date. | Time. | Tempera- ture. | | Red Blood Corp. In- fected. | The Infected Red Blood Corpuscles contained Parasites as follows:— | | | | | | |
|-------|-------|-------|-------------------|--|--------------------------------------|---|-----|-----|-----|-------|-----|---|
| | | | M. | E. | | P. | PP. | R. | D. | PPPP. | RR. | |
| | | | | | % | % | % | % | % | % | | |
| 1909. | | | | | | | | | | | | |
| 4 | Nov. | 5 | 10 a.m. | 100 | 102 ² | 0 | 0 | 0 | 0 | 0 | | |
| 5 | " | 6 | 10 a.m. | 100 ⁴ | 103 | >0.1 | 0 | 0 | 0 | 0 | | |
| 6 | " | 7 | 10 a.m. | 101 ⁶ | 103 | 0.6 | 0 | 0.2 | 0 | 0.4 | | |
| 7 | " | 8 | 10 a.m. | 104 | 105 ⁴ | 1.6 | 0.1 | 0.5 | 0.1 | 0.9 | | |
| 7 | " | 8 | 5 p.m. | <i>Injected subcutaneously 10 c.c. Trypan-red, 1 per cent. Solution.</i> | | | | | | | 0 | 0 |
| 8 | " | 9 | 10 a.m. | 104 ⁸ | 104 ² | 0.5 | 0 | 0.3 | 0.2 | 0 | | |
| 9 | " | 10 | 10 a.m. | 102 ⁴ | 103 ⁴ | >0.1 | 0 | 0 | 0 | 0 | | |
| 10 | " | 11 | 10 a.m. | 102 | 103 ² | >0.1 | 0 | 0 | 0 | 0 | | |
| 11 | " | 12 | 10 a.m. | 103 ⁴ | 104 | >0.1 | 0 | 0 | 0 | 0 | | |
| 12 | " | 13 | 10 a.m. | 99 ⁸ | 103 ⁴ | 0 | 0 | 0 | 0 | 0 | | |
| 13 | " | 14 | 10 a.m. | 102 | 102 | >0.1 | 0 | 0 | 0 | 0 | | |
| 14 | " | 15 | 10 a.m. | 101 ⁴ | 100 ⁴ | >0.1 | 0 | 0 | 0 | 0 | | |
| 15 | " | 16 | 10 a.m. | 100 ⁸ | 102 | 0.2 | 0 | 0.1 | 0 | 0 | | |
| 16 | " | 17 | 10 a.m. | 100 ⁴ | 102 | 0 | 0 | 0 | 0 | 0 | | |
| 17 | " | 18 | 10 a.m. | 100 ⁸ | 101 ² | >0.1 | 0 | 0 | 0 | 0 | | |
| 18 | " | 19 | 10 a.m. | 100 ⁸ | 103 | 0 | 0 | 0 | 0 | 0 | | |
| 19 | " | 20 | 10 a.m. | — | 102 ² | — | — | — | — | — | | |
| 20 | " | 21 | 10 a.m. | 99 ⁸ | 101 ² | 0 | 0 | 0 | 0 | 0 | | |
| 21 | " | 22 | 10 a.m. | 99 ⁶ | 102 ⁶ | 0 | 0 | 0 | 0 | 0 | | |
| 22 | " | 23 | 10 a.m. | 99 ⁸ | 102 | 0 | 0 | 0 | 0 | 0 | | |
| 23 | " | 24 | 10 a.m. | 100 ⁶ | 103 ² | >0.1 | 0 | 0 | 0 | 0 | | |
| 24 | " | 25 | 10 a.m. | 101 | 103 ⁴ | >0.1 | 0 | 0 | 0 | 0 | | |
| 25 | " | 26 | 10 a.m. | 101 ⁴ | 103 | >0.1 | 0 | 0 | 0 | 0 | | |
| 26 | " | 27 | 10 a.m. | 101 ² | 100 ⁴ | — | — | — | — | — | | |
| 27 | " | 28 | 10 a.m. | 100 ⁴ | 104 | — | — | — | — | — | | |
| 28 | " | 29 | 10 a.m. | 103 | 105 | 0 | 0 | 0 | 0 | 0 | | |
| 29 | " | 30 | 10 a.m. | 103 | 103 ⁸ | 0 | 0 | 0 | 0 | 0 | | |
| 30 | Dec. | 1 | 10 a.m. | 100 ⁴ | 101 ² | >0.1 | 0 | 0 | 0 | 0 | | |
| 31 | " | 2 | 10 a.m. | 100 ⁶ | 103 ² | >0.1 | 0 | 0 | 0 | 0 | | |
| 32 | " | 3 | 10 a.m. | 101 ⁸ | 103 ⁸ | — | — | — | — | — | | |
| 33 | " | 4 | 10 a.m. | 99 | 100 ⁸ | >0.1 | 0 | 0 | 0 | 0 | | |
| 34 | " | 5 | 10 a.m. | 99 ⁸ | 102 ² | — | — | — | — | — | | |
| 35 | " | 6 | 10 a.m. | 101 ² | 102 ⁴ | — | — | — | — | — | | |
| 36 | " | 7 | 10 a.m. | 100 ⁸ | 101 ⁸ | 0 | 0 | 0 | 0 | 0 | | |
| 37 | " | 8 | 10 a.m. | 99 ⁶ | 103 | — | — | — | — | — | | |
| 38 | " | 9 | 10 a.m. | 100 ² | 104 | — | — | — | — | — | | |
| 39 | " | 10 | 10 a.m. | 101 ⁶ | — | >0.1 | 0 | 0 | 0 | 0 | | |
| 40 | " | 11 | 10 a.m. | — | — | — | — | — | — | — | | |
| 41 | " | 12 | 10 a.m. | — | — | — | — | — | — | — | | |
| 42 | " | 13 | 10 a.m. | 103 | — | 0 | 0 | 0 | 0 | 0 | | |
| 43 | " | 14 | 10 a.m. | — | — | — | — | — | — | — | | |
| 44 | " | 15 | 10 a.m. | 102 ² | — | 0 | 0 | 0 | 0 | 0 | | |
| 45 | " | 16 | 10 a.m. | — | — | — | — | — | — | — | | |
| 46 | " | 17 | 10 a.m. | — | — | — | — | — | — | — | | |
| 47 | " | 18 | 10 a.m. | 99 ² | — | >0.1 | 0 | 0 | 0 | 0 | | |
| 48 | " | 19 | 10 a.m. | — | — | — | — | — | — | — | | |
| 49 | " | 20 | 10 a.m. | — | — | — | — | — | — | — | | |
| 50 | " | 21 | 10 a.m. | 100 ⁸ | — | 0 | 0 | 0 | 0 | 0 | | |
| 51 | " | 22 | 10 a.m. | — | — | — | — | — | — | — | | |
| 52 | " | 23 | 10 a.m. | — | — | — | — | — | — | — | | |
| 53 | " | 24 | 10 a.m. | 101 ⁸ | — | 0 | 0 | 0 | 0 | 0 | | |
| 54 | " | 25 | 10 a.m. | — | — | — | — | — | — | — | | |
| 55 | " | 26 | 10 a.m. | — | — | — | — | — | — | — | | |
| 56 | " | 27 | 10 a.m. | 100 | — | 0 | 0 | 0 | 0 | 0 | | |
| 57 | " | 28 | 10 a.m. | — | — | — | — | — | — | — | | |
| 58 | " | 29 | 10 a.m. | — | — | — | — | — | — | — | | |
| 59 | " | 30 | 10 a.m. | 101 ⁶ | — | 0 | 0 | 0 | 0 | 0 | | |
| 60 | " | 31 | 10 a.m. | — | — | — | — | — | — | — | | |

| Day. | Date. | Time. | Temperature. | | Red Blood Corp. Infected. | The Infected Red Blood Corpuscles contained Parasites as follows:— | | | | | | |
|------|--------|---------|------------------|----|---------------------------|--|-------|------|------|---------|--------|---|
| | | | M. | E. | | P. % | PP. % | R. % | D. % | PPPP. % | R.R. % | |
| | 1910. | | | | | | | | | | | |
| 61 | Jan. 1 | 10 a.m. | — | — | — | | | | | | | |
| 62 | " 2 | 10 a.m. | 100 ² | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 63 | " 3 | 10 a.m. | — | — | — | | | | | | | |
| 64 | " 4 | 10 a.m. | — | — | — | | | | | | | |
| 65 | " 5 | 10 a.m. | 101 ⁸ | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 66 | " 6 | 10 a.m. | — | — | — | | | | | | | |
| 67 | " 7 | 10 a.m. | — | — | — | | | | | | | |
| 68 | " 8 | 10 a.m. | 101 | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 69 | " 9 | 10 a.m. | — | — | — | | | | | | | |
| 70 | " 10 | 10 a.m. | — | — | — | | | | | | | |
| 71 | " 11 | 10 a.m. | 102 ² | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 72 | " 12 | 10 a.m. | — | — | — | | | | | | | |
| 73 | " 13 | 10 a.m. | — | — | — | | | | | | | |
| 74 | " 14 | 10 a.m. | 102 ⁴ | — | — | | | | | | | |
| 75 | " 15 | 10 a.m. | — | — | — | | | | | | | |
| 76 | " 16 | 10 a.m. | — | — | — | | | | | | | |

Dog found dead. *Post-mortem* lesions: anaemia; no parasites found in the heart, blood, and internal organs.

DOG NO. XXV.—TRYPAN-RED TREATMENT. One Injection of Trypan-red 2 per cent. Solution.

Dog 839. Mongrel. 16th November, 1909. *Injected 2 c.c. blood of dog 680.*

| Day. | Date. | Time. | Temperature. | | Red Blood Corp. Infected. | The Infected Red Blood Corpuscles contained Parasites as follows:— | | | | | | |
|------|---------|---------|------------------|------------------|---------------------------|---|-------|------|------|---------|--------|---|
| | | | M. | E. | | P. % | PP. % | R. % | D. % | PPPP. % | R.R. % | |
| | 1909. | | | | | | | | | | | |
| 8 | Nov. 24 | 10 a.m. | 101 ⁶ | 102 ² | 0.1 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 |
| 9 | " 25 | 10 a.m. | 102 ⁸ | 104 | 0.1 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 |
| 10 | " 26 | 10 a.m. | 102 | 103 | 3.3 | 0.1 | 0.9 | 1.3 | 1.0 | 0 | 0 | 0 |
| 11 | " 27 | 10 a.m. | 101 ⁴ | 102 ² | 0.4 | 0.1 | 0.2 | 0 | 0.1 | 0 | 0 | 0 |
| 11 | " 27 | 11 a.m. | — | — | — | | | | | | | |
| | | | | | | <i>Injected subcutaneously 10 c.c. Trypan-red 2 per cent. Solution.</i> | | | | | | |
| 12 | " 28 | 10 a.m. | 103 ⁴ | 103 ⁶ | 0.2 | 0 | 0.1 | 0.1 | 0 | 0 | 0 | 0 |
| 13 | " 29 | 10 a.m. | 101 ⁶ | 101 | >0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 | " 30 | 10 a.m. | 100 ⁴ | 99 ⁶ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | Dec. 1 | 10 a.m. | 101 ⁴ | 101 ⁴ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | " 2 | 10 a.m. | 100 ⁴ | 101 ⁶ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 | " 3 | 10 a.m. | 100 ⁸ | 100 ⁸ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18 | " 4 | 10 a.m. | 99 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19 | " 5 | 10 a.m. | 100 | 99 ⁴ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 | " 6 | — | 100 | — | — | | | | | | | |

Dog found dead. No parasites found in heart blood; distinct signs of anaemia; all organs slightly reddish discoloured.

DOG NO. XIV.—TRYPAN-RED TREATMENT. One Injection of Trypan-red.

(Recovered and proved to be immune in all exposure experiments.)

Dog 675. Pointer. 1st November, 1909. *Injected subcutaneously 2 c.c. blood of dog 740.*

| Day. | Date. | Time. | Temperature. | | Red Blood Corp. Infected. | The Infected Red Blood Corpuscles contained Parasites as follows:— | | | | | | |
|------|--------|---------|------------------|------------------|---------------------------|---|-------|------|------|---------|-------|---|
| | | | M. | E. | | P. % | PP. % | R. % | D. % | PPPP. % | OO. % | |
| | 1909. | | | | | | | | | | | |
| 4 | Nov. 5 | 10 a.m. | 101 ⁸ | 102 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | " 6 | 10 a.m. | 101 | 103 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | " 7 | 10 a.m. | 102 ³ | 102 | >0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | " 8 | 10 a.m. | 103 | 105 ⁶ | 0.3 | 0 | 0.1 | 0.1 | 0.1 | 0 | 0 | 0 |
| 7 | " 8 | 5 p.m. | — | — | — | | | | | | | |
| | | | | | | <i>Injected subcutaneously 20 c.c. Trypan-red 1 per cent. Solution.</i> | | | | | | |
| 8 | " 9 | 10 a.m. | 105 ⁶ | 104 ⁴ | 0.2 | 0.1 | 0.1 | 0 | 0 | 0 | 0 | 0 |
| 9 | " 10 | 10 a.m. | 103 | 104 ⁶ | 0.9 | 0.1 | 0.4 | 0.1 | 0.3 | 0 | 0 | 0 |
| 10 | " 11 | 10 a.m. | 102 ³ | 102 ² | >0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | " 12 | 10 a.m. | 103 | 104 ² | 0.7 | 0.1 | 0.3 | 0 | 0.3 | 0 | 0 | 0 |
| 12 | " 13 | 10 a.m. | 102 ⁶ | 102 | >0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Day. | Date. | Time. | Temperature. | | Red Blood Corp. Infected. | The Infected Red Blood Corpuscles contained Parasites as follows :— | | | | | | |
|-------|-------|---------|--------------|------|---------------------------|---|-----------------------------|----|----|-------|-----|---|
| | | | M. | E. | | P. | PP. | R. | D. | PPPP. | OO. | |
| | | | | | | % | % | % | % | % | % | |
| 13 | 1909. | Nov. 14 | 10 | a.m. | 101 | 109 ⁶ | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 | " | " 15 | 10 | a.m. | 100 ⁸ | 102 | >0.1 | 0 | 0 | 0 | 0 | 0 |
| 15 | " | " 16 | 10 | a.m. | 103 | 102 | >0.1 | 0 | 0 | 0 | 0 | 0 |
| 16 | " | " 17 | 10 | a.m. | 99 ⁸ | 101 ⁴ | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 | " | " 18 | 10 | a.m. | 101 | 102 | >0.1 | 0 | 0 | 0 | 0 | 0 |
| 18 | " | " 19 | 10 | a.m. | 102 | 102 ² | 0 | 0 | 0 | 0 | 0 | 0 |
| 19 | " | " 20 | 10 | a.m. | 101 ⁶ | 102 ⁶ | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 | " | " 21 | 10 | a.m. | 100 ⁴ | 103 ² | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 | " | " 22 | 10 | a.m. | 100 ⁸ | — | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 | " | " 23 | 10 | a.m. | 100 ² | 102 ⁸ | — | — | — | — | — | — |
| 23 | " | " 24 | 10 | a.m. | 100 ⁸ | 102 ⁶ | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | " | " 25 | 10 | a.m. | 100 ⁸ | 102 ² | >0.1 | 0 | 0 | 0 | 0 | 0 |
| 25 | " | " 26 | 10 | a.m. | 100 ⁶ | 101 ⁴ | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 | " | " 27 | 10 | a.m. | 100 ⁶ | 102 | — | — | — | — | — | — |
| 27 | " | " 28 | 10 | a.m. | 102 ⁴ | 102 ² | 0 | 0 | 0 | 0 | 0 | 0 |
| 28 | " | " 29 | 10 | a.m. | 101 ⁸ | 102 ² | 0 | 0 | 0 | 0 | 0 | 0 |
| 29 | " | " 30 | 10 | a.m. | 100 ⁸ | 102 ² | 0.1 | 0 | 0 | 0 | 0 | 0 |
| 30 | Dec. | 1 | 10 | a.m. | 101 ⁴ | 101 ⁶ | — | — | — | — | — | — |
| 31 | " | " 2 | 10 | a.m. | 101 | 103 ⁴ | — | — | — | — | — | — |
| 32 | " | " 3 | 10 | a.m. | 101 ⁸ | 103 ⁶ | 0 | 0 | 0 | 0 | 0 | 0 |
| 33 | " | " 4 | 10 | a.m. | 101 ⁴ | 102 ² | — | — | — | — | — | — |
| 34 | " | " 5 | 10 | a.m. | 102 | 101 ² | — | — | — | — | — | — |
| 35 | " | " 6 | 10 | a.m. | 102 ² | 103 ⁶ | 0 | 0 | 0 | 0 | 0 | 0 |
| 36 | " | " 7 | 10 | a.m. | 101 ⁸ | 101 ⁸ | — | — | — | — | — | — |
| 37 | " | " 8 | 10 | a.m. | 102 | 105 ² | — | — | — | — | — | — |
| 38 | " | " 9 | 10 | a.m. | 102 ² | 101 | 0 | 0 | 0 | 0 | 0 | 0 |
| 39 | " | " 10 | 10 | a.m. | 102 | — | — | — | — | — | — | — |
| 40 | " | " 11 | 10 | a.m. | 102 ⁴ | — | >0.1 | 0 | 0 | 0 | 0 | 0 |
| 41 | " | " 12 | 10 | a.m. | — | — | — | — | — | — | — | — |
| 42 | " | " 13 | 10 | a.m. | 102 ² | — | 0 | 0 | 0 | 0 | 0 | 0 |
| 43 | " | " 14 | 10 | a.m. | — | — | — | — | — | — | — | — |
| 44 | " | " 15 | 10 | a.m. | 101 ⁴ | — | 0 | 0 | 0 | 0 | 0 | 0 |
| 45 | " | " 16 | 10 | a.m. | — | — | — | — | — | — | — | — |
| 46 | " | " 17 | 10 | a.m. | — | — | — | — | — | — | — | — |
| 47 | " | " 18 | 10 | a.m. | 102 ⁴ | — | 0 | 0 | 0 | 0 | 0 | 0 |
| 48 | " | " 19 | 10 | a.m. | — | — | — | — | — | — | — | — |
| 49 | " | " 20 | 10 | a.m. | — | — | — | — | — | — | — | — |
| 50 | " | " 21 | 10 | a.m. | 100 ⁸ | — | 0 | 0 | 0 | 0 | 0 | 0 |
| 51 | " | " 22 | 10 | a.m. | — | — | — | — | — | — | — | — |
| 52 | " | " 23 | 10 | a.m. | — | — | — | — | — | — | — | — |
| 53 | " | " 24 | 10 | a.m. | 101 ² | — | 0 | 0 | 0 | 0 | 0 | 0 |
| 54 | " | " 25 | 10 | a.m. | — | — | — | — | — | — | — | — |
| 55 | " | " 26 | 10 | a.m. | — | — | — | — | — | — | — | — |
| 56 | " | " 27 | 10 | a.m. | 101 | — | 0 | 0 | 0 | 0 | 0 | 0 |
| 57 | " | " 28 | 10 | a.m. | — | — | — | — | — | — | — | — |
| 58 | " | " 29 | 10 | a.m. | — | — | — | — | — | — | — | — |
| 59 | " | " 30 | 10 | a.m. | 101 ⁴ | — | 0 | 0 | 0 | 0 | 0 | 0 |
| 60 | " | " 31 | 10 | a.m. | — | — | — | — | — | — | — | — |
| 1910. | | | | | | | | | | | | |
| 61 | Jan. | 1 | 10 | a.m. | — | — | — | — | — | — | — | — |
| 62 | " | " 2 | 10 | a.m. | 101 ⁶ | — | 0 | 0 | 0 | 0 | 0 | 0 |
| 63 | " | " 3 | 10 | a.m. | — | — | <i>Exposure experiment.</i> | | | | | |
| 64 | " | " 4 | 10 | a.m. | — | 103 ⁶ | — | — | — | — | — | — |
| 65 | " | " 5 | 10 | a.m. | 100 ⁸ | 101 ⁴ | 0 | 0 | 0 | 0 | 0 | 0 |
| 66 | " | " 6 | 10 | a.m. | 101 ⁶ | 102 ⁶ | — | — | — | — | — | — |
| 67 | " | " 7 | 10 | a.m. | 100 ⁴ | 101 | — | — | — | — | — | — |
| 68 | " | " 8 | 10 | a.m. | 100 | 102 | 0 | 0 | 0 | 0 | 0 | 0 |
| 69 | " | " 9 | 10 | a.m. | 99 ⁸ | 101 | — | — | — | — | — | — |
| 70 | " | " 10 | 10 | a.m. | 101 | 102 | — | — | — | — | — | — |
| 71 | " | " 11 | 10 | a.m. | 101 ⁴ | 100 | 0 | 0 | 0 | 0 | 0 | 0 |
| 72 | " | " 12 | 10 | a.m. | 100 ⁴ | 101 ² | — | — | — | — | — | — |
| 73 | " | " 13 | 10 | a.m. | 102 | 101 | — | — | — | — | — | — |

Dog proved to be immune.