TROPICAL VETERINARY BULLETIN

ISSUED UNDER THE DIRECTION OF THE HONORARY MANAGING COMMITTEE OF THE TROPICAL DISEASES BUREAU.

General Editor:
THE DIRECTOR OF THE BUREAU.

VOL. 13.

JANUARY—DECEMBER, 1925.

London:
TROPICAL DISEASES BUREAU,
23, Endsleigh Gardens, W.C.1.

1925.

HONORARY MANAGING COMMITTEE.

Dr. Andrew Balfour, C.B., C.M.G.

Major-General Sir David Bruce, K.C.B., F.R.S.

Major-General Sir R. Havelock Charles, G.C.V.O., K.C.S.I., I.M.S.

Sir Walter M. Fletcher, K.B.E., M.D., D.Sc., F.R.S.
(representing the Medical Research Council).

Dr. A. E. Horn, C.M.G.

Lieut.-General Sir William B. Leishman, K.C.B., K.C.M.G., F.R.S., K.H.P.

Professor C. J. Martin, C.M.G., F.R.S.
(representing the Royal Society).

Sir John M'Fadyean, M.R.C.V.S.

Sir S. Stockman, M.R.C.V.S.

Mr. P. B. B. Nichols, *M.C.*
(representing the Foreign Office)

with

Mr. J. B. Sidebotham,
of the Colonial Office, as Secretary.

STAFF OF THE BUREAU.

Director:
A. G. Bagshawe, C.M.G., M.B., D.P.H. Cantab.,
of the Uganda Medical Staff.

Assistant Director:
J. F. C Haslam, *M.C.*, M.D., D.P.H., M.R.C.P.E.

Secretary and Librarian:
R. L. Sheppard.

Editor of the
Tropical Veterinary Bulletin:
A. Leslie Sheather, D.Sc., M.R.C.V.S.

CONTENTS.

SECTIONS.

ERRATA.

Vol. 13, No. 1, p. 1. Van der Elst Abstract, last line, and in title of Walraven's paper, *for Trypanosoma rodhain read Trypanosoma rodhaini.*

Vol. 13, No. 1, p. 6, 14th line from bottom, name of first author of paper on *Eimeria utinensis* for Lelau (U.), *read* Selan (U.).

Vol. 13, No. 1, p. 13. Thornton Abstract, line 5, *for* Phaecocaerus *read* Phacochoerus.

(K2841) Wt P2256/213 700 3/26 H & Sp Gp 52

TROPICAL DISEASES BUREAU.

TROPICAL VETERINARY BULLETIN.

VOL. 13.] February 28, 1925. [No. 1.

DISEASES DUE TO PROTOZOAN PARASITES.

VAN DER ELST (O.). **Sur la transmission mécanique de la trypanosomiase.** [The Mechanical Transmission of Trypanosomiasis.]—*Bull. Méd. du Katanga.* 1924. Aug. Vol. 1. No. 4. pp. 130–132.

The author records two outbreaks of trypanosomiasis, one among cattle and the other among pigs, in which the evidence appeared to indicate mechanical transmission. There was complete absence of Glossina and the outbreaks occurred during the season when Stomoxys and Tabanidae were numerous. Among the pigs abortion occurred. The deaths amounted to 30 per cent. Orpiment, atoxyl, and emetic alone or in conjunction failed to effect any cures, and, in fact, appeared to hasten death in many instances.

Seven bovines were found infected on the premises. These were slaughtered. In the pigs the parasite appeared to be *T. rodhain.*

WALRAVENS (P.). **La trypanosomiase chez le porc due au** *Tryp. rodhain* **(n. sp.)** [Trypanosomiasis in the Pig due to *T. rodhain* n.sp.]—*Bull. Méd. du Katanga.* 1924. Aug. Vol. 1. No. 4. pp. 132–133.

The trypanosome was found in pigs on the same premises as were visited by ELST.

In moist preparations the parasite executes wriggling movements, which do not involve much translation.

In stained preparations the parasite presents a long, very slender body, a central nucleus, a blepharoplast which is close to the margin of the body and quite close to the posterior end. The undulating membrane is poorly developed. There is always a long free flagellum. The parasite is invariably monomorphic. No measurements are given.

CURSON (H. H.). **The Causal Organisms of Nagana.**—MS. of a Note Communicated to the South African Association for the Advancement of Science at Capetown, July 1924.

"Nagana" is the Zulu name for a disease in domesticated animals (chiefly bovines) characterized by emaciation, progressive weakness, and terminating generally in death.

In 1894 BRUCE detected parasites, later designated *T. brucei* by PLIMMER and BRADFORD, "in the blood of certain animals." In

(K2336) Wt P19/149 750 2/25 H & Sp Gp 52

1909 THEILER showed that *T. congolense* occurred in Zululand, and was responsible for a disease similar to that caused by *T. brucei.* Nagana should therefore not be applied solely to the condition caused by *T. brucei. T. congolense* is far more important economically in cattle than *T. brucei,* the condition set up by the latter being, comparatively speaking, mild. In 1921 Curson showed that *T. vivax* also occurs in Zululand, and is responsible for a condition closely resembling Nagana. This parasite has as yet been found in cattle only.

Nagana should be used as the term indicating the group of trypanosome infections, the symptoms of which are practically common.

VAN SACEGHEM (René). **Note préliminaire sur l'action du Bismoxyl dans les trypanosomiases.** [Preliminary Note on the Action of Bismoxyl in Trypanosomiasis.]—*C. R. Soc. Biol.* 1924. Oct. 24. Vol. 91. No. 29. pp. 914–917.

The author has prepared bismoxyl by mixing in equal quantities a 1 per cent. solution of bismuth tartrate and an extract of ox liver. The latter was prepared by mixing one volume of liver pulp with two volumes of salt solution. The mixture is incubated at 37° C., and bismoxyl is precipitated.

Experiments in the treatment of trypanosomiasis have been carried out with the moist precipitate and with the drug in dry powder form. Two experiments were made with the drug in the former condition. The first animal, a cow infected with *T. congolense,* was given intravenously the precipitate obtained from 350 cc. of liver extract and 350 cc. of bismuth tartrate solution. The precipitate was washed several times and then injected in 700 cc. of normal salt solution.

As this failed to remove trypanosomes from the circulation, a second larger dose was given (precipitate from 450 cc. of each component in 850 cc.). The animal died, apparently from anaphylactic shock, during the injection. The second animal received the injection subcutaneously. Trypanosomes were not cleared from the circulation.

With the dry powder three animals were treated. The doses used were 7 to 9 grammes in the first instance. One animal also received a dose of 40 g. All the injections were given subcutaneously. In no case were trypanosomes cleared from the circulation.

VAN SACEGHEM (René). **Action de l'hexaméthylène-tétramine (Urotropine) dans les trypanosomiases animales.** [Urotropin in the Treatment of Trypanosomiasis.]—*C. R. Soc. Biol.* 1924. Oct. 24. Vol. 91. No. 29. pp. 917–918.

Urotropin in a 40 per cent. solution has been used for the treatment of animals affected with *T. congolense* and *T. cazalboui* var. *vivax,* by intravenous injection.

Doses of 8 to 16 g. of the drug were used, and two or three doses were given. They were without effect upon the trypanosomes in the circulation.

VAN HOOF (L.). **Action du "Bayer 205" sur les trypanosomiases animales. (Note complémentaire.)**—*Ann. Soc. Belge. Méd. Trop.* 1924. Nov. Vol. 4. No. 2. pp. 255–256.

A trypanosome infection was found among some Dahomey cattle near Leopoldville. The parasite was dimorphic. "Some showed a

very short free flagellum, and others were stumpy without free flagellum." The author believes that the parasite was *T. dimorphon* Laveran and Mesnil. The first passages through the guineapig produced a moderately severe infection. The period of incubation was about three weeks, and the period of infection was at the most a fortnight. From the third passage the disease became far more severe. the period of incubation was reduced to 4 days and that of illness to 4 to 8 days.

The parasite was pathogenic for the goat (incubation 7 days, illness 15 days), and monkey (incubation 6 days, illness 18 days). A dose of 0·5 g. of tryparosan per kilo. caused the disappearance of the trypanosome in the monkey in 48 hours. The strain has been kept at the School of Tropical Medicine in Brussels, where the virulence has gradually become attenuated.

The parasite is not affected by Bayer 205 [no details are given].

SCHMIDT (Fritz). **Virulenzänderung des** *Trypanosoma equinum* **nach Behandlung mit "Bayer 205."** [Alteration of Virulence of *T. equinum* after Treatment with "Bayer 205."]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1924. Sept. Vol. 28. No. 9. pp. 397–403.

In the author's first experiments dogs were infected with Mal de Caderas and were treated per os with "205." Doses of 0·3 g. were given up to a total amount of 2·5 to 3 g. The effect was to clear the circulation for about 10 days. The parasites did not appear to have been "fast" to the drug by this treatment, for a single injection of 0·5 g. effected a complete cure.

Blood was taken from one of these dogs at the first appearance of trypanosomes after treatment per os, and was injected into a mule which had already been cured of an experimental infection with Caderas. Trypanosomes appeared on the 26th day. An intravenous injection of 0·5 g. of "205" was given, and for 42 days the circulation was free from parasites. A second injection was given, and a complete cure was effected.

Subsequent experiments performed with blood derived from animals which had been treated with "205" failed to yield any evidence that the trypanosomes acquire any degree of "fastness" to the drug.

LUENGO (E.) & DE BUEN (S.). **Pouvoir trypanolytique du sérum d'un malade traité par le "Bayer 205."**—*C. R. Soc. Biol.* 1924. Oct. 7. Vol. 91. No. 28. pp. 825–827.

Three experiments were carried out with the object of ascertaining whether the serum of a patient treated with "205" possessed any protective powers, and whether these were due directly to the drug itself or not.

The authors have been able to come to the provisional conclusion that the trypanocidal action is not due solely to the drug itself, but in part to properties developed by the serum, in part, perhaps, due to the destruction of the trypanosomes. The trypanocidal power of the serum appears to be variable with a certain periodicity.

If there is any immunity produced, as has been suspected, the object of treatment with "Bayer 205" should be the progressive destruction of trypanosomes rather than complete sterilization by the chemical direct.

KUDICKE (R.), STRAUSS (Ed.) & COLLIER (W. A.). **Versuche zur Gewinnung von trypanoziden Substanzen durch Hydrolyse von Eiweisskörpern.** [Attempts to obtain Trypanocidal Substances by the Hydrolysis of Albumens.]—*Zeitschr. f. Hyg. u. Infektions-Krankh.* 1924. Sept. Vol. 103. No. 3. pp. 622–639.

In the mixture of albumoses and peptones which results from hydrolysis of albumens there are substances which are capable of destroying trypanosomes *in vitro*. It is possible that products of further breaking down of protein may act in a similar way. The possibility suggests itself that similar substances are produced in the animal body and assist in the combat against the parasites.

QUIROGA (S. S.). **La prueba de fijacion del complemento en el diagnóstico del "Mal de Caderas."** [The Complement Fixation Test in the Diagnosis of Mal de Caderas.]—*Revist. Zootecnica.* 1924. July 15. Vol. 10. No. 130. pp. 195–203.

The author's conclusion is that the complement fixation test cannot replace existing methods of diagnosis.

KNOWLES (R.), NAPIER (L. E.), & SMITH (R. O. A.). **On a Herpetomonas found in the Gut of the Sandfly,** *Phlebotomus argentipes*, **fed on Kala-azar Patients.**—*Indian Med. Gaz.* 1924. Dec. Vol. 59. No. 12. pp. 593–597.

In ten out of eleven consecutive experiments female laboratory-bred *P. argentipes*, fed upon parasite-containing blood of Kala-azar patients, showed typical herpetomonad forms in the fore-gut and mid-gut at the third to the fifth day after the feed. No less than 25 out of 56 such fed flies showed herpetomonads, and in six instances the infection was a heavy one, although the patients' blood films showed only scanty *L. donovani* present.

2. On dissection and examination of 811 control sandflies, including both *P. minutus* and *P. argentipes*, the only natural infections encountered have been once a Rickettsia, three times a Bodo, and once a doubtful Spirochaete. Nothing resembling a Herpetomonad has been encountered.

3. On dissection and examination of 46 other control female *P. argentipes* fed upon persons not suffering from Kala-azar no protozoa were found.

4. It is concluded that *L. donovani* passes into its flagellate form in the gut of *P. argentipes* under suitable conditions of temperature and humidity. Any further conclusions with regard to the Kala-azar transmission problem, however, are at present carefully avoided.

AVARI (C. R.) & MACKIE (F. P.). **Canine Leishmaniasis in Bombay.**—*Indian Med. Gaz.* 1924. Dec. Vol. 59. No. 12. pp. 604–605. With 1 text fig.

A pariah dog was found having a superficial sore near the base of the ear. Films were made and leishmania-like parasites were found in fair numbers. A week later the sore was found to be healed and there remained a small nodule covered with a scab.

This was excised, broken up and rubbed into scarifications on a dog and a monkey. The result of this is not recorded.

Bombay is not an indigenous centre of human kala-azar, while Assam, Bengal and Madras are highly endemic areas. This is apparently the first case of canine leishmaniasis recorded from India. The facts appear to suggest that there is no connection between the canine and human diseases.

SERGENT (Et.), GUEIDON (E.), BOUGUET (A.), & CATANEI (A.). **Existence de la leishmaniose cutanée chez le chien dans une localité du Tell algérien où le bouton d'Orient est endémique chez l'homme.** [The Occurrence of Cutaneous Leishmaniasis in Dogs in a District in which Oriental Sore occurs in Man.]—*Bull. Soc. Path. Exot.* 1924. May. Vol. 17. No. 5. pp. 360–361.

Leishmania have been found to be present in large numbers in ulcers on a dog at a village in the Constantiné Department, where several cases of oriental sore have been recorded recently.

The dog was in good general condition. Below the right nostril there was a crater-like ulcer about 4 mm. in diameter. On the inner surface of the ears there were found scabs covering ulcers varying from 3–5 mm. in diameter. The scabs were thick and of a greyish yellow colour. Leishmania were found in exudate from these lesions.

Those found in the nasal lesion were round or oval, but many of those found in the lesions of the ear were fusiform. The parasites from the ears were smaller than those from the nose.

The parasite recorded by YAKIMOFF as occurring in cutaneous leishmaniasis in dogs in Turkestan were more than twice as large (7.8μ) as those found in Constantiné.

ADELHEIM (R.). **Über Leishmaniosis infantum et canina in Riga.** [Infantile and Canine Leishmaniasis in Riga.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1924. Sept. Vol. 28. No. 9. pp. 367–387.

The author records a case of leishmaniasis in a five-year-old girl at Riga. The family had been in Tashkent about three months previously and the child had been ill about four months. Blood preparation showed no malarial parasites, and the clinical picture of the case did not indicate malaria as the cause of the illness. Spleen puncture was resorted to, and Leishmania were found in large numbers.

No benefit accrued from any treatment until tartar emetic was given intravenously.

In the course of an inquiry as to possible means by which the girl became infected, it was ascertained that the family possessed a dog which had been brought to Riga with them. The animal, in spite of care and attention, was thin and ill. A blood smear was made, but no parasites were discovered. The dog was killed, and it was found to be affected with generalized leishmaniasis. There appears to be no doubt that the girl was infected either directly or indirectly from the dog.

An attempt was made to obtain cultures on slanting agar which had been smeared over the surface with rabbit blood, but no success was achieved. Mice, guineapigs, and rabbits were inoculated subcutaneously. No evidence of infection was found in the last two,

but the mice became infected, and some of them died in about 6 months. Others appeared to recover from the inoculation.

Evidence was also obtained that healthy mice can contract the infection when kept in close contact with diseased mice.

MÖLLER (Jens). **Kokzidien bei den Säugetieren des Zoologischen Gartens zu Berlin.** [Coccidiosis of Mammals in the Zoological Gardens, Berlin.]—*Inaug. Diss. Doct. Med. Vet. Berlin.* 1923. June 30. 23 pp. [Ex. *Bull. Inst. Pasteur.* 1924. Oct. 31. Vol. 22. No. 20. pp. 801–802.]

Apart from rabbits and goats, few of the animals in the Berlin Zoological Gardens harbour coccidia.

An Eimeria has been found in the squirrel of the Carolines. Oocysts 22–28μ by 14–18μ.

Two lion cubs were parasitized. The oocysts ranged from 36–48μ by 28–34μ. It was an Isospora and possibly identical with *Isospora felis.*

VORBRODT (Karl). **Zur Kenntnis der Schafkokzidiose.** [Coccidiosis of the Sheep.]—*Inaug. Diss. Doct. Med. Vet. Berlin.* 1923. 32 pp. [Ex. *Bull. Inst. Pasteur.* 1924. Oct. 31. Vol. 22. No. 20. pp. 802–803.]

According to the author, the portions of the intestine chiefly invaded are the duodenum and jejunum.

FRENZ (Otto). **Beiträge zur Kenntnis der Schweinekokzidiose.** [Coccidiosis of the Pig.]—*Inaug. Diss. Doct. Med. Vet. Berlin* (no date). 14 pp. [Ex. *Bull. Inst. Pasteur.* 1924. Oct. Vol. 22. No. 20. p. 805.]

The author believes that 75 per cent. of German pigs are infected with coccidia. The parasite is not responsible for serious illness save in young pigs. The parasite invades the jejunum and ileum. The oocysts measure 24–36μ by 18–26μ. Two species could not be distinguished.

LELAU (U.) & VITTORIO (A.). **Nuovo Coccidio nel cavallo** (*Eimeria Utinensis*). [A New Coccidium of the Horse. *Eimeria utinensis.*]—*La Clin. Veterinara.* 1924. Oct. Vol. 47. No. 10. pp. 587–592.

The parasite is described as having been detected in a fifteen-year-old horse which was brought to the abattoirs for slaughter on account of paralysis and general wasting. Ill-defined nodular lesions were present in the lungs, particularly in the apical lobes. The bronchi contained clots which incompletely filled the lumen, some white and some red.

The liver contained a few small nodules. These had calcified fibrous capsules and caseous contents.

Coccidia were found in material taken from the lesions in the lungs, bronchi, bronchial mucosa, and liver.

The authors give rough sketches of the parasites and interpret these as covering the complete cycle of the parasite. The sketches are not very convincing.

TRIFFITT (M. J.). **Note on an *Eimeria* n.sp. found in the Faeces of an Eland.**—*Jl. Trop. Med. & Hyg.* 1924. Aug. 15. Vol. 27. No. 16. pp. 223–225. With 1 plate.

The eland, *Oreas canna*, was imported from Durban into the Zoological Gardens, London.

Oocysts were numerously present in the faeces and measured from 23·5μ to 34μ in length by 16·5μ to 20μ in breadth.

The cyst wall comprised three layers. The outer was a very thin membrane, the middle one double contoured but reduced in thickness at the poles. Internal to this, and slightly separated from it, was a delicate membranous lining. A micropyle was found at one of the flattened poles.

In specimens fixed in Schaudinn the cyst wall became indented at the poles. The contents formed a protoplasmic ball about 15μ in diameter. It was found to be impossible to stain the intact cysts. At room temperature the organism sporulated in the faeces in twelve days. At 70° F. development was completed in five days.

The process of sporulation occurred in the typical way.

Attempts to infect two clean rabbits failed.

The author gives a table of the sizes of the principal species of Eimeria and comes to the conclusion that it is a distinct species. The name *Eimeria canna* is proposed.

CATANEI (A.). **Etude expérimentale de l'association de la spirochétose et du paludisme des oiseaux. Note préliminaire.** [The Experimental Study of the Association of Spirochaetosis and Malaria in Birds.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 535–538.

The author's investigations were undertaken with a view to ascertaining whether the infections when present simultaneously have any influence on each other.

The idea originated from the fact that simultaneous infections in man with the spirochaete of relapsing fever and malarial organisms have been encountered in Algeria on a number of occasions. Canaries have been used because they are susceptible to infection with *S. gallinarum* and *Pl. relictum*. Spirochaetes appear in the blood two days after inoculation, they persist for 3–4 days and then disappear. No symptoms are observed as a rule, and recovery leaves immunity.

The plasmodium infection has a period of incubation of 3 to 10 days. This is followed by an acute phase, which persists for about 9 days. Parasites become very numerous in the blood during this period and there is a mortality of 30 per cent. Parasites then decrease in numbers. Complete recovery does not take place, but the birds appear to be perfectly healthy. They are then immune.

Canaries infected with spirochaetosis during either the period of incubation or during the acute phase of plasmodium infection have developed severe forms of both diseases. Those inoculated with plasmodium on the last day of spirochaetal paroxysm developed an acute attack which followed a normal course.

Nine canaries which were infected with plasmodium were inoculated with spirochaetes at intervals ranging from 1 month to 3 years and 9 months after recovery from the acute infection. In six instances a relapse to plasmodium infection occurred. Ten canaries having plasmodium infection of 1 to 4 months' standing were inoculated with the blood of a canary which was suffering from acute spirochaetosis and chronic plasmodium infection. Nine showed relapses to plasmodium infection. One bird was reinoculated with spirochaetes after the recovery from the relapse and a second relapse occurred which proved fatal.

ADIE (Helen). **The Sporogony of** *Haemoproteus columbae.*—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 605–613. With 5 figs. & 2 plates.

Mrs. Adie draws attention to the fact that her researches in this connection, published in the *Indian Journal of Medical Research* in January 1915, have not been incorporated in some of the text books dealing with this subject. She has had the opportunity of demonstrating in Algerian flies the stages of development of *Haemoproteus columbae* observed in the Indian transmitting flies. Sporozoites reach the salivary glands 10–12 days after the infecting feed. The gametocytes appear in the blood 28 days after the injection of the sporozoites by the flies.

The cycle is therefore similar to that of the proteosoma parasite. It is another instance of the cycle of Ross.

LOGÉ & BIZARD (E.). **Sur 4 cas de piroplasmose équine** (*Piroplasma caballi*) **observés dans le département de la Loire-Inférieure.** [Four Cases of Equine Piroplasmosis (*Piroplasma caballi*) in the Department of Loire-Inférieure.]—*Bull. Soc. Path. Exot.* 1924. May. Vol. 17. No. 5. pp. 347–354.

Case 1. An eighteen-year-old mare which came into close contact with American horses during the war was found to have parasites in its blood. Oval, ring, pear-shaped and twin forms were found. The number of infected corpuscles was about 1 per cent.

This animal was treated with novarsenobenzol. Parasites were present in the blood for three days after treatment, and death occurred on the fourth day.

At the post-mortem the principal lesions were enlargement of the spleen (6 kg.), enlargement of the liver (11 kg.), congestion of the intestines, pale pink pleural exudate, congestion of the lungs and kidneys.

Case 2. A four-year-old mare. Examination of this animal's blood showed that the parasites were far more scantily present than in the preceding case. The case was first seen when illness had been in existence for four days. An intramuscular injection of trypanblue was given. Two days later an injection of cacodylate of soda was given. Improvement set in and recovery took place.

Case 3. A six-year-old mare born at Limousinière and bought at Nantes in March, 1924. The animal was taken ill 15 days after arrival at Montoir. During this period it was grazed with two apparently

perfectly healthy horses in a pasture which had not had a horse upon it for ten years.

Parasites were found to be scantily present in the blood. An injection of novarsenobenzol was given. Recovery took place.

Case 4. Seven-year-old mare. This animal had been ill for about a week, and had been treated by a quack. When first seen the animal was down and could rise with difficulty only. There was marked jaundice, and the temperature was 40·4° C.

An intravenous injection of 5 g. of trypanblue was given. The following day there was considerable improvement in the animal's condition. Parasites were found to be scantily present in the blood. There was no haemoglobin in the urine, but a considerable amount of albumen.

All the animals presented the same clinical symptoms: fever, jaundice, dullness, uncertainty of gait. Ticks, *Dermacentor reticulatus*, were found on all of them. In no case was haemoglobinuria observed.

DONATIEN (A.), LESTOQUARD (F.), & SAUSSEAU (L.). **Piroplasmes et Jaunisse des Muletons du Poitou.** [Piroplasms and Jaundice in Mules in Poitou.]—*Rev. Vét.* 1924. Sept. Vol. 76. No. 9 pp. 529–531.

An account of this parasite has appeared elsewhere and has been abstracted in this *Bulletin*.

ANDERSON (Ch.). **Note concernant la Toxoplasmose du Gondi.** [Toxoplasmosis of the Gondi.]—*Bull. Soc. Path. Exot.* 1924. May. Vol. 17. No. 5. pp. 354–355.

The author found toxoplasmosis in two gondis which died 29 and 34 days respectively after capture.

In connection with the possible transmission of the infection by ectoparasites the author records that he found *Dermanyssus gallinae* and *Laelaps stabularis*.

GALLEGO (A.). **Contribucion al estudio de las lesiones del higado en la tiflohepatitis de los pavos.** [The Lesions of the Liver in "Blackhead."]—*Revist. Hyg. y. Sanidad Pecuarias.* 1924. Sept. Vol. 14. No. 9. pp. 555–560.

The author describes the lesions found in a turkey. They did not differ in appearance from those described by other authors. In sections from apparently normal portions of the liver a perivascular infiltration was found, and in the lesions themselves there were areas of amyloid degeneration.

POPOFF (P.). **An Attempt at growing Pathogenic Protozoa by the Method of Collodion Sacks.**—*Jl. Trop. Med. & Hyg.* 1924. Sept. 15. Vol. 27. No. 18. pp. 247–248.

The author proposes a method of cultivating protozoa which is free from the objections of the method devised by BASS for malarial parasites. The objections which he raises to Bass's method are: (1) That the toxins remain in contact with the organisms; (2) that

in the natural condition the blood is always moving; and (3) that cultures are exposed to light.

He claims that he has overcome these difficulties as follows:—

The defibrinated blood containing malarial parasites has added to it 50 per cent. glucose. This blood is placed in collodion sacs, which are immersed in tubes of normal saline, Ringer's or Locke's Solution, and incubated at 37° to 41°. He states that he has used the method for malarial parasites of man, birds, and tortoises, and also for the parasite of a disease which he terms blackwater fever of cows. Dextrose is added every four hours, and the salt solution changed every four hours. No details are given of the results obtained, and the manner of adding the dextrose is not made more clear than is given here.

KŘIVÁČEK (O.). **Spirochätenbefunde beim Hundetyphus.** [Spirochaetes in Dog Typhus.]—*Zeitschr. f. Hyg. u. Infektionskrankh.* 1924. Sept. 20. Vol. 103. No. 3. pp. 529–532.

During an epidemic of Stuttgart disease during the autumn and winter of 1922–23 the author examined the viscera of 21 dogs dead of the disease.

Spirochaetes were demonstrated in 17 cases. The author is not certain that the four cases in which he was unable to find spirochaetes were actually cases of Stuttgart disease.

The most important place to look for the parasite is in the tubules of the kidney. They may be found there within the cells or in the lumen. The author has used LEVADITI'S original method of silver impregnation for the demonstration of the parasite.

They may occur in other organs, but very scantily. In three cases they were found in the deep layers of the wall of the stomach and intestine, and the author does not think that the organisms in these situations were saprophytes which had invaded the damaged wall.

GERLACH (F.). **Geflügelspirochätose in Oesterreich.** [Fowl Spirochaetosis in Austria.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1924 June 16. Vol. 92. Nos. 1-2. pp. 84–96. With 2 plates (one in colour).

The author records the occurrence of this disease in Austria, and gives particulars of the post-mortem appearances and pathological anatomy. He has been unable to find any evidence of developmental forms in the red corpuscles.

COUVY (L.). **Note sur le traitement de la dysenterie amibienne par le stovarsol.** [The Treatment of Amoebic Dysentery by Stovarsol.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 555–556.

ILOWAISKY (N. S.) & BOSCHENKO (W. P.). **Posthume Materialien von S. A. Ilowaisky betr. experimentelle Trypanosomose Su-auru bei verschiedenen Tieren.**—*Rev. Microbiol. et Epidemiol.* Saratov. 1924. Vol 3. No. 3. In Russian pp. 166–181. German summary p. 181.

PHISALIX (M.). **Note complémentaire sur** *Cyclospora viparae*, **coccidie parasite de l'intestin de la Vipère aspic.** [Note on *Cyclospora viparae*, a Coccidium of the Intestine of *Vipera aspis*.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 559–562.

RODENWALDT (Ernst) & DOUWES (J. B.). **Ueber die Anwendung von "Bayer 205" bei der Surra des Pferdes in Niederländisch-Ostindien.**— *Arch. f. Schiffs- u. Trop.-Hyg.* 1923. Oct. Vol. 27. No. 9. pp. 305–320. [1 ref.]

DISEASES DUE TO METAZOAN PARASITES.

CAWSTON (F. G.). **The Source of South African Trematodes.**— *Ann. Trop. Med. & Parasit.* 1924. Oct. 31. Vol. 18. No. 3. pp. 343–346.

South African trematodes develop most frequently in freshwater snails whose shells are from 15–20 mm. in length, but those species whose shells are only 4 to 6 mm. in diameter are occasional carriers of parasites and must not be overlooked.

General measures to be resorted to for the prevention of Bilharzia infection are :—

1. The introduction of domestic ducks.
2. The use of lime or some larvicide in small collections of water.
3. Drying up small collections of water for at least a week at a time.
4. Where possible, sea-water should be allowed to enter lagoons into which snails are brought by the rivers.
5. The collection and destruction of such species as *Melanoides tuberculata*, which has been found too stout for ducks to eat.

CAWSTON (F. G.). **Occasional Hosts of some South African Trematodes.**—*South African Jl. Sci.* 1923. Dec. Vol. 20. pp. 351–353.

This paper refers to the occasional occurrence of *Schistosomum bovis* in human beings. *Schistosoma mansoni* has been found in *Limnaea natalensis*, *Indora tropica*, and *Physopsis africana*.

Limnaea natalensis is the common host of *Fasciola gigantica* in South Africa, but its cercaria has been recorded in *Physopsis africana* in Natal.

DOLLFUS (R. Ph.). **Qu'est-ce que "*Distoma subflavum* Sonsino"?** [What is "*Distoma subflavum* Sonsino"?]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 572–576. With 1 text fig.

The author thinks it possible that *D. subflavum* Sonsino is identical with *D. allostomum* Diesing 1850.

PAYNE (Florence K.), ACKERT (James E.) & HARTMAN (Ernest). **The Question of the Human and Pig** *Ascaris.*— *Amer. Jl. Hyg.* 1925. Jan. Vol. 5. No. 1. pp. 90–101.

Summary :—

1. The host relationship of the human and pig ascarids was tested by the administration of embryonated ascaris eggs to pigs and primates.

2. Repeated feedings of infective human ascaris eggs were made to five young pigs, all of which suffered respiratory disturbances and

other systemic disorders. Subsequent post-mortem examinations showed no ascarids in the digestive tract of any of the pigs.

3. Infective pig ascaris eggs were taken by one monkey and by two human subjects. Faecal examinations made throughout periods of several months after the initial administration of the eggs failed to show the presence of any ascaris eggs.

4. The incidence of ascaris in north, central, and southern Trinidad, British West Indies, varied from 20 to 70 per cent. for the human ascaris and from 3·5 to 10·8 per cent. for the pig ascaris. In the vicinity of Arouca, one of the principal swine-raising regions, the incidence of human ascaris was 64·3 per cent., as compared with 10·8 per cent. for the pig ascaris.

5. The experimental results indicated that embryonated eggs of the human ascaris will not produce mature ascarids in pigs, that infective eggs of the pig ascarids will not produce mature ascarids in the adult primates, monkey and man, and that there is thus a physiological difference between the human and pig ascaris.

GOODEY (T.). **A Critical Review of Zebrowski's Preliminary Report on Hog Lung-Worms.**—*Jl. Helminth.* 1924. Sept. Vol. 2. No. 4. pp. 198–202.

Goodey's attention was drawn to ZEBROWSKI'S observations published in the proceedings of the Indiana Academy of Science for 1921, by a reference made to them in *Veterinary Medicine* for March, 1924, by HALL. Goodey has consulted the original publication and finds that it is of little value.

GOODEY (T.). **Observations on** *Hyostrongylus rubidus* **(Hassall and Stiles 1892) Hall 1921, from the Stomach of the Pig, with a Note on** *Strongylus attenuatus* **(Molin 1860).**—*Jl. Helminth.* 1924. Sept. Vol. 2. No. 4. pp. 191–197. With 9 figs.

The author has detected this parasite in the stomachs of pigs in England, previous records of its occurrence in this country having been published by BLACKWELL and PILLERS. Goodey elaborates the description of certain anatomical features not previously described in full, and gives an account of the rhabditiform and of the ensheathed infective larvae.

BLANCHARD (M.) & LAIGRET (J.). **Recherches sur la transmission d'***Onchocerca volvulus* **par divers parasites hématophages.** [The Transmission of *Onchocerca volvulus* by Various Blood Sucking Parasites.]—*Bull. Soc. Path. Exot.* 1924. May. Vol. 17. No. 5. pp. 409–417.

Microfilariae ingested by bugs were found to be digested rapidly. Those ingested by *Ornithodorus moubata* were found to be alive and motile for several days after the feed, in one case up to the 12th day. No development of the embryos was found to occur in the ticks, and the embryos withdrawn from infected human beings by the ticks were found to be incapable of penetrating shaved skin of the guineapig.

Ticks removed while feeding on an infected man and placed on a guineapig did not regurgitate any of the larvae ingested.

It is not claimed that any solution to the problem of transmission has been provided.

ILIESCO (G. M.). **Hémorragies multiples cutanées, sous-coutanées et intra-musculaires chez le cheval, produites par une infestation en masse de la Filaire hémorragique.** [Multiple Cutaneous, Subcutaneous, and Intramuscular Haemorrhages in a Horse caused by *Filaria haemorrhagica*.]— *Arch. Veterinara.* 1923. Vol. 17. No. 6. pp. 116–119. With 1 text-fig.

The horse was nine years old and in a state of advanced debility. Haemorrhagic lesions were present over the whole of its body and were so close to each other that the animal had the appearance of being covered with a continuous wound. The owner said the animal had been in his possession three years and no haemorrhagic wounds had been seen on it until about two months before the animal came under observation. It was kept for about a month, during which time, in spite of a liberal diet, wasting continued.

On post-mortem examination no lesions of the internal organs were found. Throughout the subcutaneous tissue, and in the superficial muscles, haemorrhagic centres were found. The skin was thickened round each of the lesions.

The lesions in the superficial layers of the muscles showed dark red centres, and slightly indurated margins. Their average size was that of a nut. Careful examination of divided lesions revealed the presence of worms in them. In some cases only one worm was found. In other lesions worms up to 6 in number were detected. Both males and females were found, and the parasite was identified by CIUREA as *F. haemorrhagica* Railliet 1885.

The author states that CIUREA detected cervical papillae which were provided with a small chitinous point which was directed backwards. This has not been described before. The male parasites measured 26–27 mm. and the females 50–57 mm.

THORNTON (H.). **A Review of the Oesophagostomes in the Collection of the Liverpool School of Tropical Medicine.**— *Ann. Trop. Med. & Parasit.* 1924. Oct. 31. Vol. 18. No. 3. pp. 393–408.

O. columbianium, O. venulosum, O. radiatum, O. dentatum, O. eurycephalum, O. mwanzae, O. simpsoni, O. oldi, are dealt with, and in the case of some of the more recently described parasites the descriptions are amended.

A new species, from the caecum and colon of *Phaecocaerus aethiopicus*, *O. yorkei*, is described. *Oesophagostomum ventri* from the stomach of a Brazilian wild cat is also described.

HANSON (KARL B.) & VAN VOLKENBERG (H. L.). **Anthelmintic Efficiency of Carbon Tetrachlorid in the Treatment of Foxes.**— *Jl. Agric. Research.* 1924. Apr. 26. Vol. 28. No. 4. pp. 331–337.

The chemically pure drug was administered either in hard gelatin capsules or in soft elastic globules to animals fasted for 16 to 20 hours.

No purgative was given before or after. Details are given of the treatment of batches of foxes at dosage rates of 0·1 cc. to 0·6 cc. per kilo.

The results obtained in some of the experiments appeared to indicate the advisability of withholding food and water for three hours after administration ; otherwise dilution of the drug may occur in the stomach.

A high degree of efficiency was given by 0·2 cc. per kilo and upwards. Hookworms and ascarids were removed almost completely, as were also intestinal flukes and Physaloptera, but it appeared to be ineffectual for the removal of tapeworms. Neither the hard nor the soft capsules appeared to have any advantage over the other as a means of administration, but it appears that inhalation collapse is more likely to occur when the hard capsules are used. Of 13 foxes, for which hard capsules were used, one collapsed, but recovered when artificial respiration was resorted to. Of eighteen animals to which soft globules were given, none collapsed. In all four animals died, but the authors hold the drug responsible for three of these deaths only. Two fatalities occurred in pups one month old. These received the 0·3 cc. rate of dosage, and the indications are that this is too high for so young animals. Diet probably had something to do with the deaths.

It has been found by LAMSON and others that the greater susceptibility of puppies to carbon tetrachloride is due to the fat present as milk. Digestible fat appears to increase toxicity. The authors' experience, recorded elsewhere, is that susceptibility varies not only with individual foxes, but, as has been found when repeated treatments have been given, in the same animal at different times.

They hold that factors other than the magnitude of the dose are concerned in the causation of fatalities. Among these they include : Intestinal stasis, enteritis, and the nature of the food.

Although in the experiments here recorded no purgative was used, it is advised that the drug be used in conjunction with a saturated solution of Epsom salts. HALE and SCHILLINGER, in treating dogs, advise the simultaneous administration of the two medicaments. The drug becomes less dangerous and its efficacy is not impaired.

CIUREA (T.) & DINULESCU (G.). **Ravages causés par la mouche de Goloubatz en Roumanie ; ses attaques contre les animaux et contre l'homme.** [The Ravages caused by the Goloubatz Fly in Roumania.]—*Ann. Trop. Med. & Parasit.* 1924. Oct. 31. Vol. 18. No. 3. pp. 323–342. With 3 plates.

The authors describe the serious losses among animals and the effects produced in man by the bites of the Goloubatz fly (*Simulium columbaczense* Schiner) in Jugoslavia.

The attacks of this fly are well known to the villagers, who ordinarily succeed in protecting their animals against the pest, but it occasionally happens that the flies appear in immense swarms. This occurred in the spring of 1923, when the venomous bites of the flies were responsible for the death of 16,000 animals.

It appears to be not improbable that the flies were carried long distances by the wind. They also travel parallel to streams. The flies settle on the mucous membranes and on the thinner parts of the skin and become engorged. This occupies about five minutes. Animals attacked may traverse some miles in their attempts to escape the pest. Sometimes they dash into water to avoid the flies. It has been observed that black skinned animals are more severely attacked

than animals of other colours. This appears to be the explanation of the fact that buffalos are the heaviest sufferers.

The flies appeared to take refuge in woods during the middle of the day, for they were observed to attack animals between sunrise and ten o'clock, and again from about four o'clock onwards.

The bite of the fly causes small haemorrhages, and where many bites are close together the area involved may be covered with blood. At the seat of a bite a little button-like swelling forms, and where these are close together large oedematous painful swellings are produced. Animals that have been heavily attacked present symptoms indicative of asphyxia. They move with great difficulty, the mouth is open and the tongue pendulous. The eyes have an anxious expression and respiration is difficult. Death takes place in a few hours. Animals which, although severely bitten, do not succumb within a few hours lose their appetite, show rigors and acceleration of pulse and respiration. The temperature is normal or slightly above normal. They become apathetic, pulse and respiration become almost imperceptible, the temperature falls below normal, and death takes place in about a week.

At the post-mortem examination the principal viscera, and particularly the heart, liver and kidneys, show congestion and degenerative changes. Protective measures include working during hours when the flies are not biting, placing the animals in darkened stables, the use of smoke either to prevent the entrance of flies into the stables or to protect animals while at work. Various decoctions are applied to the vulnerable parts of the skin, among which are absinthe leaves, walnut leaves, hazel-nut leaves, tobacco infusion, mixtures of mineral or vegetable tar with lard, or lard alone.

External applications to bitten areas should be alkaline, and internally cardiac stimulants are used.

BLANC (Georges) & CAMINOPETROS (J.). **La Tick Paralysis observée sur les moutons de la région de Sitia (Crète).** [Tick Paralysis in Sheep in Crete.]—*Bull. Soc. Path. Exot.* 1924. May. Vol. 17. No. 5. pp. 378–381.

Tick paralysis appears to have been known to shepherds in Crete for thirty years. The disease appears at the end of the autumn and persists until March or April. Occasional cases occur at other periods. In some years the disease is severe, attacking one-third of the sheep.

Affected sheep show convulsions and progressive paralysis, and ticks are always found along the vertebral column. Immediately symptoms appear ticks are searched for behind the ears, and oil is used to detach them. It is said that when the ticks are removed at an early stage recovery takes place.

The authors have had a number of ticks for examination (not taken from diseased sheep) and found that two species, *Haemaphysalis punctata* and *Ixodes ricinus*, were represented.

VAN HOOF (L.). **Conservation du pouvoir infectieux de l'*Ornithodorus moubata* nourri sur reptiles et sauriens.** [The Retention of Infectivity by *Ornithodorus moubata* fed upon Reptiles and Lizards.]—*Bull. Soc. Path. Exot.* 1924. May. Vol. 17. No. 5. pp. 376–378.

The author's experiments were carried out as a control to those of RHODAIN, and concerned the retention of infectivity with *Spirochaeta*

duttoni. Van Hoof found that the virus was retained, probably because of its location in the sexual glands. There it would not be influenced by unusual alimentary material. He found that feeding the ticks on reptiles caused a high death rate among them, apparently because the blood is not readily digested.

CAMERON (A. E.). *Sarcoptes* **of Cattle.**—*Parasitology*. 1924. July. Vol. 16. No. 3. pp. 255–265. With 6 text figs.

In the introductory paragraphs of this paper attention is drawn to a point regarding the measurements of the mites. Parallel observations showed that the measuring of mounted parasites may yield results very different from those taken from the living parasite. A tabular statement shows the readings obtained from individual parasites. Mounted parasites are far larger than the living ones.

The sarcoptes of cattle differ from those of the horse in certain points, but it is impossible to indicate these without the author's figures.

BEDFORD (G. A. H.). **The External Parasites of Poultry, with Measures for their Control.**—*S. Africa. Jl. Dept. Agric.* 1924. Aug. Vol. 9. No. 2. pp. 123–140.

This paper deals with ticks, mites, lice, fleas, mosquitos, sand flies, and the pigeon fly.

BATHELLIER (J.). **Premiers résultats zoologiques de l'étude des rats et des puces à Phnom-Penh.** [First Results of a Zoological Survey of the Rats and Fleas at Phnom-Penh.]—*Bull. Soc. Path. Exot.* 1924. May. Vol. 17. No. 5. pp. 372–375.

CHARRIER (H.). **Les Moustiques de la région de Tanger (Maroc).** [The Mosquitos of Tangier.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 570–572.

EVANS (A. M.). **Descriptions of New Mosquitos from South America.**—*Ann. Trop. Med. & Parasit.* 1924. Oct. 31. Vol. 18. No. 3. pp. 363–375.

INGRAM (A.) & MACFIE (J. W. S.). **The Mosquitos of Accra.**—*Ann. Trop. Med. & Parasit.* 1924. Oct. 31. Vol. 18. No. 3. pp. 263–264.

KOSUGE (I.). **Beiträge zur Biologie der Mikrofilaria immitis.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1924. Aug. Vol. 28. No. 8. pp. 340–351. With 1 chart. [14 refs.]

LEGER (A.) & COUPUT (A.). **Nasomyiase à** *Chrysomyia dux*, **Esch.** [Nasal Myiasis due to *Chrysomyia dux*, Esch.]—*Bull. Soc. Path. Exot.* 1924. May. Vol. 17. No. 5. pp. 375–376.

NÖLLER (W.) & SPREHN (K.). **Die Entwicklung des Leberegels bis zur Zerkarie in** *Limnaea stagnalis*. [The Development of the Liver Fluke up to the Cercarial Stage in *Limnaea stagnalis*.]—*Berlin. Tierärzt. Wochensch.* 1924. July 18. Vol. 40. No. 29. pp. 369–370.

PATTON (W. S.). *Hypoderma crossii* **sp. nov., parasitic in its Larval Stages in Cattle and Goats in the Punjab.**—*Indian Jl. Med. Res.* 1922. Oct. Vol. 10. No. 2. pp. 573–578. With 2 plates & 4 figs.

TAYLOR (E. L.). **On the Ascarids of the Dog and Cat.**—*Ann. Trop. Med. & Parasit.* 1924. Oct. 31. Vol. 18. No. 3. pp. 243–251. With 7 text figs.

BACTERIAL DISEASES.

SOBERNHEIM (G.) & MURATA (H.). **Vergleichende Untersuchungen über die Bedeutung des Infektionsmodus bei der experimentellen Milzbrandinfektion.** [The Comparative Importance of the Various Methods of Infection in Experimental Anthrax.]—*Zeitsch. f. Hyg. u. Infektionskrankh.* 1924. Nov. 10. Vol. 103. No. 4. pp. 691–698.

In investigating questions of this nature the dose of organisms used is of extreme importance. This point appears to have been overlooked in some of the recent work.

The authors' experiments have been carried out with exact doses of suspensions of agar cultures of virulent anthrax bacilli. The cultures used were 20-hour growths.

Intracutaneous inoculations were made on shaved areas on the abdomen. When other methods of inoculation were resorted to care was taken to avoid infection of the skin by injecting through a previously made wound in the skin which was held open during the inoculation. The exposed cut surfaces were then seared with a hot glass rod and painted with collodion. In all cases 4 to 6 animals were inoculated at the same time in order to exclude accidents.

The results in experiments with guineapigs showed that death followed inoculation in all cases, no matter what the seat of infection. Death usually occurred on the 2nd or 3rd day, and the post-mortem appearances were typical.

The results showed that there was no difference of any importance between the intracutaneous and subcutaneous paths. In the experiments performed intramuscular inoculation was actually the most fatal. By the intraperitoneal and intravenous paths the the minimal lethal dose was somewhat higher.

Similar results were obtained with mice inoculated subcutaneously and intravenously.

Experiments were also performed in which capillary glass tubes containing definite amounts of bacterial suspension were placed under the skin and broken after the skin wound had healed. The value of these experiments was discounted, however, because of the possibility of fragments of glass damaging the under surface of the skin when the tubes were broken, and thus converting the inoculation into a cutaneous one. Another objection to this method is that the bacillus is actually being incubated in the subcutaneous tissue during the period required for the healing of the skin wound. In this way the dose may be very materially altered through multiplication of the organisms.

It has also been held that in any form of inoculation there is some wound of the skin, and that although contamination of that wound may be avoided at the time the inoculation is made, the bacilli may eventually reach it either by the blood or the lymph stream, and so cause a skin infection.

These objections are entirely removed by infection via the mouth.

The authors have used sporulating cultures and have administered these in measured quantities direct into the stomach through a tube passed down the oesophagus. Fatal results were obtained, although infection required a far larger dose than parenteral inoculation. Thus, while 1/100,000 part of a loopful of a certain suspension proved fatal by intracutaneous inoculation, the dose required to cause infection

by way of the stomach was 1/10 of a loopful. Death took place on the fourth day. The authors conclude that it is unjustifiable to assert that the skin is the only tissue susceptible to anthrax infection.

It is not difficult to understand why the lethal dose varies with the method of infection.

VELU. **Immunisation du mouton et du bœuf contre le charbon bactéridien par intra-dermo vaccination.** [Immunization of Sheep and Cattle against Anthrax by Intra-dermo Vaccination.]—*Maroc Médical.* 1924. May 15. No. 29. 159–161.

The present communication has for its object the definition of a point of terminology and the specification of the operative technique of intra-dermo vaccination. The author points out that a number of terms have been used for various operations involving the implantation of test liquids such as tuberculin or of vaccines into the skin, and states that to avoid confusion he proposes to use the term intra-dermo vaccination for the method of vaccinating against anthrax.

His reason for resorting to intra-dermo vaccination is that simple cutaneous vaccination and transcutaneous vaccination (ARLOING & DUFOUR) do not permit of exact dosage.

Various parts of the body have been tried as the seat of vaccination, but final choice has rested upon the anal folds beneath the tail. The reasons for so doing were as follows: The anal folds require no preliminary preparation and are readily cleansed. The skin there is easily rendered immobile. By raising the tail the skin is made tense and the needle can be inserted into the skin. Should the needle be passed through the skin no harm results.

GRATIA (A.). **Production d'Anticorps dans la cuti-immunité anti-charbonnneuse.** [The Production of Antibodies in Anti-Anthrax Cuti-Immunity.]—*C. R. Soc. Biol.* 1924. Oct. 7. Vol. 91. No. 3. pp. 795–797.

The author is unable to agree with BESREDKA that antibodies cannot be demonstrated in the serum of animals immunized against anthrax by the cutaneous path, and states briefly that he is able to demonstrate protective properties in the serum of guineapigs protected by cuti-vaccination.

He thinks that if anti-anthrax vaccination is actually more effective by the cutaneous than by the subcutaneous path it is because the skin, being more favourable to the multiplication of the organisms, allows the vaccines introduced to exercise their aggressive powers. The animal body responds with anti-aggressines, which are the real protective substances. Vaccines introduced subcutaneously are rapidly phagocytized and are unable to exert their powers of stimulation of antibody production.

LECLAINCHE (E.) & VALLÉE (H.). **Charbon symptomatique et gangrènes gazeuses chez les bovidés.** [Black Quarter and Gas Gangrene in Cattle.]—*C. R. Acad. Sci.* 1924. June 16. Vol. 178. No. 25. pp. 2024–2027.

This paper has appeared elsewhere and has been abstracted (see this *Bulletin*, Vol. 12, p. 134).

SMITH (Theobald) & LITTLE (Ralph B.). **Studies in Vaccinal Immunity towards Disease of the Bovine Placenta due to** *Bacillus abortus* **(Infectious Abortion).**—*Monographs of the Rockefeller Inst. Med. Research.* 1923. Nov. 15. No. 19. 124 pp.

The authors carried out a number of experiments with living and dead vaccines, but they are not able to add to our knowledge of the subject of immunization against contagious abortion.

FITCH (C. P.) & LUBBEHUSEN (R. E.). **A Study of the Presence of** *Bact. abortus* **in the Milk of Cows which react to the Agglutination Test.**—*Cornell Vet.* 1924. July. Vol. 14. No. 3. pp. 299–302. With 2 tables.

The results obtained by these authors run closely parallel with those obtained by others. They find that approximately 30 per cent. of reacting cows have abortion bacilli in their udders, and that there is no concordance between the agglutinin content of the milk and blood.

EDINGTON (J. W.). **The Bacteriological Study of Fowl Typhoid and Allied Infections with Special Reference to Three Epidemics.**—*Jl. Path. & Bacteriol.* 1924. Oct. Vol. 27. No. 4. pp. 427–437.

MYCOTIC DISEASES.

BIGOT (A.) & VELU (H.). **Contribution à l'étude anatomo-pathologique de la lymphangite épizootique.** [The Morbid Anatomy of Epizootic Lymphangitis.]—*Rec. Méd. Vét.* 1924. July 30. Vol. 100. No. 14. pp. 374–384.

The authors find that the lesions wherever they occur are structurally the same.

The invaded tissues react by a proliferation of the connective tissue cells, fixed and migratory, which tend to ingest the parasite. An inflammatory nodule is thus formed. An invasion of polynuclear leucocytes occurs more particularly when pyogenic bacteria gain access to the lesion. Three zones are recognizable in a lesion. There is an outer zone of fibrous proliferation, an intermediate zone of mononuclear celled infiltration, and a central area of pus cells and the causal organism, the latter often being present in zooglea.

The conclusion to be drawn is that surgical intervention is called for in the treatment of the disease, as well as specific vaccino-therapy.

BAROTTE (J.) & VELU (H.). **Essais d'isolement en cultures du cryptocoque de la lymphangite épizootique du cheval, par l'emploi de milieux à l'acide citrique.** [The Isolation of the Cryptococcus of Lymphangitis on Media containing Citric Acid.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 540–543.

The authors' recent investigations have led them to try media containing citric acid for the isolation of the cryptococcus.

The first attempts were made with broth, peptone water, and Sabouraud's agar containing 5 per mille citric acid. The latter medium, while proving unsuitable for the cultivation of the organism, did not act upon it injuriously, since subcultures on other media were readily obtained from the small amounts of growth obtained upon it.

The citric acid medium was also used for the cultivation of organisms frequently associated with the cryptococcus in lesions. No growth was obtained with a staphylococcus and mixtures of organisms such as are obtained from contaminated natural lesions. Cryptococci present in a mixture of bacteria did not grow, but subcultures on other media yielded pure growths, all the contaminations having disappeared.

Tests were carried out with a view to determining whether the citric acid exercised an actual sterilizing or merely an inhibitory action, and the results indicated that there was actual sterilization of the accidental organisms.

Further experiments are to be carried out to determine the minimum effective proportion of citric acid.

MIEGEVILLE. **Note clinique sur la blastomycose oculaire de l'âne.** [Clinical Note on Blastomycosis of the Eye in the Donkey.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 543–545.

Blastomycosis of the eye in the donkey is of frequent occurrence in the Beni-Mellal area, Morocco. In 88 per cent. of cases the lesion is unilateral and always in adult or aged animals. In all cases in which bilateral disease has been seen the lesion in one eye has been of recent origin and the other of long standing.

The lesion, which develops very slowly, appears to originate on the posterior border of the membrana nictitans, and takes the form of a little hard nodule. The membrana nictitans appears congested and oedematous, and slight conjunctivitis and keratitis make their appearance. Up to this stage the lesion usually escapes the owner's notice. The nodule increases in size and ulceration occurs. This results in the formation of a muco-purulent discharge which collects at the inner canthus and runs down the face. If the lesion is not attended to it continues to increase in size until it attains the size of a pigeon's or even a hen's egg. By this time it has almost entirely displaced the eye.

Later the maxillary sinus is involved by way of the osseous portion of the lachrymal canal, and a rarefying ostitis is produced with deformation and sometimes necrosis of the bone.

On four or five occasions the author has found the sinus apparently completely filled with a tumour-like mass, but he has never seen invasion of the nasal cavities. He has not been able to undertake serious bacteriological or histological examinations of the growths, but the smears that he has examined have invariable contained a cryptococcus which is possibly the cause of the disease.

There is evidence to show that the condition, if not contagious, is inoculable. Treatment follows general surgical practice, but relapse is frequent.

VELU (H.). **La blastomycose des voies lacrymales de l'âne et son inoculabilité.** [Blastomycosis of the Lachrymal Tract in the Donkey and its Inoculability.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 545–547.

Blastomycosis of the eye, which is of very common occurrence in all parts of Morocco, appears to be caused by an organism morphologically resembling *Cryptococcus farciminosus*. Up to the present all attempts to cultivate it upon media used for that organism have failed, but it has been found to be inoculable from donkey to donkey. The material used was an emulsion of one of the tumour-like growths, and the dose used was about 0·1 cc. inoculated under the conjunctiva.

Three donkeys were used. In one the reaction to the inoculation was very prompt, a lesion making its appearance six days later. In the other two the periods of incubation were 30 and 45 days respectively. The lesions developing after the shorter periods of incubation (6 and 30 days) behaved like normal lesions, but in the other animal the lesion remained small and after a time became sclerosed and shrunken. In the conjunctival secretions the organism exactly resembles the *Cryptococcus farciminosus*. In scrapings from the lesions the parasite occurs singly or in groups of 8 to 10 elements embedded in a mass of amorphous material. Impression preparations show that these zooglea may contain as many as three hundred individual elements.

Up to the present filamentous forms and ascospores are not known.

The name *Cryptococcus mirandei* is proposed.

BIGOT (A.). **Différents procédés de coloration des cryptocoques pathogènes en médecine vétérinaire.** [Staining Methods for Pathogenic Cryptococci.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 547–551.

The author reviews the various methods which have been used for staining the parasite and concludes that none of them are very satisfactory.

He has devised a method which is said to stain the protoplasmic contents intensely, leaving the envelope refractile.

Fixing is of first importance, and only preparations fixed in Bouin-Duboscq have given good results.

Smears and impressions are fixed in Bouin for 20 to 24 hours. They are then washed in water, treated with lithium alcohol and again washed in water.

Tissues for sectioning are fixed in Bouin-Duboscq for 24 to 48 hours, according to their size. They are then treated in the lithium bath to effect decolorization. This decolorization of the section is repeated after passage to absolute alcohol and 90 per cent. alcohol.

Smears and impressions are stained with carbol violet for at least 4 hours. Sections must be stained for 24 to 30 hours. They are placed in Lugol solution for 5 minutes, then thoroughly decolorized. Eosin in water or eosin-orange may be used as counterstains. Staining troughs should be used to avoid deposits falling on the specimens.

Mann's stain gives good results if it be allowed to act for 16 to 24 hours for smears and 30 hours for sections. Aniline safranine should be applied for 5 to 10 hours to smears and 25 to 30 hours to sections. Haemalum requires 15 hours for smears and 30 for sections. Giemsa requires 20 to 30 hours.

BIGOT (A.) & VELU (H.). **Blastomycose des voies lacrymales de l'âne. Anatomie pathologique.** [The Morbid Anatomy of Blastomycosis of the Lachrymal Tract in the Donkey.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 551–553. With 1 plate.

Three zones can be made out in all the lesions examined.

Lymphocytes are most numerous in the outer zone, while plasmocytes are by far the most numerous in the middle and inner zones. The plasmocyte cells are generally isolated in vacuoles or on the surface of connective tissue fibres, and never present an appearance suggestive of a mass of epithelioid cells.

In the central zone vacuole-like spaces are found which contain masses of the parasite embedded in an amorphous matrix. Plasma cells are sometimes present on the surface of these masses. The lesion is non-vascular.

DISEASES DUE TO FILTERABLE VIRUSES.

AUSTRALIA (Commonwealth of). Dept. of Health. Service Publication (Veterinary Hygiene) No. 1. **Rinderpest in Western Australia in 1923,** by ROBERTSON (W. A. N.). pp. 1–58. With 9 plates and 5 maps.

This report contains a fully detailed account of an outbreak of rinderpest which occurred in Western Australia in November, 1923. The first cases occurred in a dairy herd in the Beaconsfield area, and within a short time a number of herds became affected. A second centre of infection was discovered at Belmont, and a quarantine area of 30 miles from Fremantle was proclaimed, and the border was patrolled to prevent all movement of cattle, food and vegetables.

On further confirmation as to the nature of the disease it was decided that inoculation of any kind was not indicated.

Veterinary assistance from other States was promptly forthcoming, and with Government assistance a campaign of eradication was carried out.

Details are given of a number of post-mortem examinations and of experimental inoculations. The latter were not carried to a conclusion as it was decided to be unwise to continue centres of infection.

All the affected herds could be shown to have been in contact to some extent.

The evidence appeared to incriminate sheep brought into Fremantle as live ship's stores (for Mohammedans) as the source of the infection. These were purchased by local butchers for slaughter.

The factors which assisted in the eradication of the disease were :—

1. The somewhat sparse cattle population.
2. Little interchange of stock.
3. The existence around Fremantle of a natural barrier in the form of desert country supporting no cattle.
4. The light, dry, sandy soil.
5. The season at which the outbreak occurred. Hot, cloudless weather.
6. The policy adopted of slaughtering all animals within a mile radius of an outbreak.

KAKIZAKI (C.). **Experimental Studies on the Prophylactic Inoculation against Rinderpest.**—*Kitasato Arch. Exp. Med.* 1924. Oct. Vol. 6. No. 2. pp. 139–197. With 13 charts.

The author has carried out a number of experiments with a view to determining under what conditions the rinderpest virus in splenic pulp can be attenuated by means of glycerin and the effects of such a vaccine.

His experiments cover an immense amount of ground, but it is a matter for regret that so few experiments have been carried out in each section. In many instances controls have been omitted completely.

The actual method of preparing the vaccine was described by the author in 1918 and is not included in this paper.

He finds that an emulsion of spleen in glycerin may retain its antigenic properties after it has become non-infective. Calves treated with two doses of vaccine were protected for 5-6 months, but calves treated with a dose of vaccine followed by virulent blood were protected for more than 12 months. An interval of 7-8 days must elapse between the use of the vaccine and the inoculation with virulent blood, or the calf may become infected. The method appears to be inferior to the serum-simultaneous method.

SCHEIN (H.) & JACETOT (H.). **A propos de la vaccination contre la peste bovine par virus attenué.** [Vaccination against Rinderpest by means of Attenuated Virus.]—*Rev. Gén. Méd. Vét.* 1924. Sept. 15. Vol. 33. No. 393. pp. 493–500.

The authors refer to the results claimed by VAN SACEGHEM in the attenuation of the virus of rinderpest and state that it is a matter for surprise that such good results should have been obtained. One of the authors carried out experiments on lines similar to those followed by VAN SACEGHEM in collaboration with YERSIN some 25 years ago. No good results were obtained and the method was abandoned. These experiments are recorded in the present paper as they have not been published previously. Recently, further experiments have been carried out on similar lines.

Ten calves were treated in the manner suggested by VAN SACEGHEM. Seven died, one contracted a rather severe attack of the disease, and the remaining two passed through mild attacks. Four goats so treated all died.

The virulence of the rinderpest virus does not appear to be capable of being modified by any of the ordinary means. Either it is killed or it is left unchanged. By passage through goats and buffalos it has appeared to be possible to modify the virulence for cattle to some extent. The varying mortality in outbreaks is due to variations in susceptibility rather than variations in virulence.

DOUTRESSOULLE. **Rapport sur la recherche d'une methode d'immunisation active des veaux non sevrés, provenant de mères réfractaires à la peste bovine.** [Attempts to devise a Method of immunizing against Cattle Plague the Calves of Animals that are Resistant.]—*Rec. Méd. Vét.* 1924. Aug. 15. Vol. 100. No. 15. pp. 464–468.

It has already been shown that the calves of resistant cows become susceptible to rinderpest when they are weaned, the susceptibility increasing with age.

A small number of experiments have been carried out and these appear to indicate that the calves of refractory animals may be inoculated with virulent blood alone without much risk.

DE MAGALHAES (O. C.). **Peste dos Polmões.** [Abscess Plague.]—*Mem. Inst. Oswaldo Cruz.* 1923. Vol. 16. No. 1. (English Version.) pp. 185–286. With 51 illustrations.

The author describes a disease which appears to be a purulent lymphangitis of cattle, but he recognizes acute forms of the disease in which death is sudden and not preceded by any recognizable symptoms.

The author states that the pus obtained from unruptured abscesses always contained large numbers of bacteria of different types. For a long time he failed to obtain cultures from the pus, but finally discovered that this was because the organisms present were anaerobes.

The lesions present in the so-called "fulminating" cases are those of a septicaemia.

In the chronic form the skin is "riddled with abscesses of different sizes" which if they have not burst become enclosed in thick fibrous capsules.

When the muscles are involved the pus burrows into their substance and does not become encapsuled.

The cause of the disease is held to be a filtrable virus which is associated with the various organisms found in the pus.

It has to be admitted that it is difficult to obtain a clear idea of the subject from the author's English version of his work.

STAUDFUSZ (R.), SCHULTZ (E.), SCHNAUDER (F.), PETERS (W.), & FRENZEL (W.). **Untersuchungen über die ansteckende Blutarmut des Pferde.** [Infectious Anaemia of Equines.]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1924. July. Vol. 51. No. 2. pp. 154–176.

The principal difficulty experienced in connexion with infectious equine anaemia is that of establishing a diagnosis. The authors bring forward further evidence to show that inoculation of rabbits with suspected blood greatly facilitates a diagnosis. A diagnosis can be made within a fortnight, based upon the reduction in the number of corpuscles in the test animal's blood.

They further show that the virus can be carried on in rabbits in series, and also obtained evidence that the virus is present in the saliva, urine and faeces of infected horses.

OPPERMANN. **Ziele und Wege der neueren Forschungsarbeiten über die infektiöse Anämie des Pferdes.** [New Investigations in connexion with Infectious Equine Anaemia.]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1924. Sept. 1. Vol. 51. No. 3. pp. 260–279.

The author states that when experimental inoculation of rabbits with material from a case presenting suspicious symptoms either fails or yields a doubtful result, steps may be taken which will render a

subsequent test positive. This may be achieved by bleeding the horse, withholding water for 24 hours, and then watering copiously. Tests made with blood taken a few days later yield positive results.

Oppermann is opposed to the view that the disease is insect transmitted—the facts, in his opinion, do not lend support to this view.

It has been discovered that the serum of horses affected with anaemia in a minimum dilution of 1 in 20 is capable of agglutinating the red corpuscles of rabbits.

However, if the horse has been infected for a long period and is obviously ill the reaction does not take place. This is said to be due to the appearance of anti-agglutinins in the horse's serum.

Full details of technique are promised later.

SCHUCHMANN (K.) & KARMANN (P.). **Die Diagnose du infektiösen Anämie der Pferde durch den Kaninchenversuch nach Oppermann.** [The Diagnosis of Equine Infectious Anaemia by the Inoculation of Rabbits.]—*Berlin. Tierärzt. Wochensch.* 1924. Sept. 12. Vol. 40. No. 37. p. 497–502.

The authors confirm the value of rabbit inoculation as a means of diagnosis of infectious anaemia in equines, but point out that doubtful results are obtained in some cases.

The value of the method is somewhat reduced by the fact that repeated blood counts have to be made. This requires special skill, but at the same time is very tedious.

Until some more simple method of diagnosis is devised the application of the inoculation test will be limited.

HELM (R.). **Die kunstliche Übertragung der infektiösen Anämie des Pferdes auf Meerschweinchen und Kaninchen.** [The Experimental Transmission of Infectious Equine Anaemia to the Guineapig and the Rabbit.]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1924. Oct. 1. Vol. 51. No. 4. pp. 365–391.

The author claims to have been able to transmit infectious equine anaemia to guineapigs and rabbits.

In guineapigs the blood showed the changes characteristic of anaemia. Polychromasia was present in proportion to the severity of the symptoms shown.

The duration of the changes in the blood varied from a few days to a few weeks.

For the purpose of examining the blood changes films were dried in the air, fixed in alcohol and stained in alkalinized Giemsa. In some specimens blood platelets were very numerous, and from some of the appearances observed the author came to the conclusion that they originate in the red blood corpuscles.

Detailed observations have not been made regarding the white corpuscles, but in all cases there was a more or less marked leucocytosis. In a few instances in which the blood changes were very marked there was a pronounced increase in the neutrophile polynuclear leucocytes. Of 67 guineapigs inoculated markedly positive results were obtained in 29, less marked results in 14, 7 were doubtful, 7 were negative, and 9 died a few days after inoculation. Of three guineapigs inoculated from another guineapig, two reacted and one gave a doubtful result.

A preliminary investigation showed that the average number of red cells in the guineapig is 5,000,000. Infection resulted in a reduction to 3,000,000 in some cases, but the figure never fell below that.

The amount of blood obtainable by ear puncture in the guineapig was not sufficient to permit of quantitative tests for haemoglobin being carried out. Infection in all cases was associated with a rise of temperature.

Microscopic examination of the organs of infected guineapigs showed that in most cases there were perivascular infiltrations in the liver.

In rabbits the period of incubation is variable, and in the author's experiments it ranged from one day to eight weeks. There was great variation in the severity of the symptoms presented.

Contrary to what is the case in the guineapig, the blood of infected rabbits does not present a typical appearance. On the other hand, the reduction in the number of red cells is very pronounced.

Clinically, the infection was characterized by a rise of temperature and catarrh of the upper air passages, and abortion in the case of pregnant animals.

In most cases the infection was transmitted by intraperitoneal inoculation, but in two instances the disease was transferred to healthy animals by the use of the same needle for bleeding the diseased and healthy rabbits, one immediately after the other.

The observation of JAFFÉ and SILBERSTEIN that passages through rabbits increases the virulence of the virus was confirmed.

DONATIEN (A.) & LESTOQUARD (F.). **L'anémie pernicieuse du mouton et de la chèvre.** [Pernicious Anaemia of the Sheep and Goat.]—*Rec. Méd. Vét.* 1924. July 30. Vol. 100. No. 14. pp. 386–391.

The authors find that this disease occurs among sheep and goats in Algeria. They have observed it among these animals purchased by the Pasteur Institute (Algeria) for other experimental purposes.

The disease is characterized by a very unsteady temperature, loss of condition, and death in a few weeks or months. Experimentally, it has been found that the disease is due to a filterable virus which can be transmitted to the sheep, goat, horse, ass, and calf. The principal lesions are to be found in the cortical portion of the suprarenal capsules. The cortical cells show homogeneous cytoplasm and vacuolation of the nuclei; oedema, haemorrhages and diapedesis are also seen.

RINJARD (M.) & DEGOIS (M.). **Hémo-vaccination et aphtisation sous cutanée au Centre national zootechnique de Vaux-de-Cernay.** [Haemo-vaccination and Subcutaneous Aphthisation in Foot-and-Mouth Disease.]—*Rec. Méd. Vét.* 1924. July 30. Vol. 100. No. 14. pp. 392–400.

On April 6th, 1924, a case of foot-and-mouth disease was detected in an animal at the National Zootechnical Centre at Vaux-de-Cernay. It occurred in a bull which had been placed in a stall at the Saint-Benoit farm the previous day. This animal, among others, had been shown at an Agricultural Show. These had not been distributed to the various farms until they had been under observation for eleven

days. Nothing had been observed during this period, but no temperatures had been taken and no examinations had been made of the buccal mucous membranes. The first case having been detected the day after the animals had been scattered to the various premises, there was a fear that others might be affected and distribute the contagion. Two days later the disease made its appearance on another farm.

Three years previously one of these farms had suffered from a severe visitation of foot-and-mouth disease. The prospects on the present occasion were more serious since there were larger numbers of more valuable animals on the premises.

About 150 litres of blood from convalescent animals were available for inoculation purposes and it was decided to inoculate immediately the calves and lambs, heifers, bulls, and those animals which had recently won prizes at the agricultural show.

The various activities of the Centre made it essential that the outbreak should be cut short and the losses reduced if that were possible.

The injections were given on the lines suggested by VALLÉE and CARRÉ, with the exception of three valuable bulls which were seriously ill. These were given several litres of the blood.

At the beginning each animal was injected subcutaneously with a mixed sample of blood obtained from, as a rule, 16 convalescents. Young animals received 2 to 3 cc. per kilo. live weight, and adults 1·5 to 3 cc.

This was followed 1 to 5 days later by an inoculation with mixed virulent sera. The lambs were given 2·5 cc., the cows 4 cc., and the other bovines 5 cc. The blood available sufficed for the injection of 236 lambs, 36 calves and 84 cows.

In the flocks only the lambs were treated and a risk of losses among the adult sheep had to be taken. The materials available were not sufficient to deal with all the animals. The sheep were selected because the results of the disease are made good far more rapidly in them than in bovines. In addition to this, it subsequently appeared that in sheep the disease became generalized in a benign form very rapidly.

At Saint-Benoit, the only farm upon which cattle were attacked at the moment, 14 animals were exposed to contagion for the double purpose of providing virus and to act as controls of the susceptibility of the herd.

Thirty-three animals which became infected at pasture were inoculated subcutaneously with 1 cc. of virulent serum, and at the same time all the animals in the uninfected stalls were similarly inoculated.

Two bulls and a cow which were inoculated after the development of the disease made uneventful recoveries. Eight animals which had received the convalescent blood developed the disease within 48 hours, and before any virus had been given. Thus the statement made by the Research Laboratory that the disease cannot be arrested if inoculations are given during the period of incubation was confirmed.

Nineteen calves which received blood and virus remained free from infection, although three of them were in the infected shed, and two of these received the blood inoculation only 24 hours before their dams developed the disease. They remained with their dams. The milch cows and the working oxen which were treated all resisted

infection. There was no loss of milk, and the oxen continued to work.

Ninety-five Southdown lambs were inoculated and none of them contracted infection even from the ewes, among which there were as many as thirty cases at one time.

The 33 animals which were inoculated subcutaneously with virulent serum passed through a mild attack of the disease.

On another infected farm 52 lambs were subjected to haemo-vaccination and all remained healthy although with infected ewes.

Haemo-vaccination was carried out on two farms where the possibility of infection was suspected, but where no cases had actually occurred.

On one of these 39 bovines were inoculated with blood and virus and remained healthy.

At the other 89 lambs were inoculated. These remained healthy when the disease broke out among adult sheep later. As blood was not available in sufficient quantities at the time 8 calves, 11 cows, and 6 oxen were left for several days before they were inoculated. Six animals were kept in contact with these with a view to ascertaining whether animals undergoing haemo-vaccination were a source of danger to others.

Unfortunately 4 of the cows and 1 calf which had been vaccinated developed typical symptoms of the disease. The disease also broke out among the control batch. In these it was far more severe than in the vaccinated animals.

The blood used in those inoculated was a mixture of only eight different samples. The protective power of such mixtures is less than when a larger number of bloods are mixed, and larger doses should have been used.

Of the animals left to test the susceptibility of the herd, and including those which were in the incubative stage before inoculation, 22 developed the disease in a severe form. Six escaped infection.

VALLÉE (H.) & CARRÉ (H.). **Sur l'obtention du sérum anti-aphteux.** [The Preparation of Anti-Foot-and-Mouth Serum.]—*Rec. Méd. Vét.* 1924. July 30. Vol. 100. No. 14. pp. 359–363.

The authors have followed the lines laid down by LIGNIÈRES, but they failed to produce an effective serum.

FROSCH (P.) & DAHMEN (H.). **Die Morphologie und Kultur des Maul- und Klauenseucheerregers.** [The Morphology and Cultivation of the Causal Organism of Foot-and-Mouth Disease.]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1924. July. Vol. 51. No. 2. pp. 99–122. With 2 plates and 1 text fig.

This paper elaborates the earlier report of the discovery of the causal organism of foot-and-mouth disease. The claim is definitely made that cultures can be obtained on solid media and that these cultures are composed of minute colonies which are only visible when highly magnified. The morphology of the organism itself was revealed by photographic means alone. For this purpose ultra-violet light of a definite wave length was used. The organism is described as a short rod about 0·1μ in length.

In the cultivation of the parasite Dahmen first passed the liquid through a Berkefeld filter to free it from accidental contaminations. All previous experiments in the cultivation of the virus had been carried out with liquid media, turbidity being as a rule the index of growth. Dahmen turned his attention to solid media so that the question of actual growth, by obtaining visible colonies, could be definitely settled, and also to avoid as far as possible the simple transference of virus from tube to tube without actual multiplication taking place. Further incubation was carried out at temperatures below that of the body, the argument in support of this being that the disease develops in superficial parts only, and at the extremities where the temperature is lower. Dahmen considers that the fluid in the bullae is a reaction product, and consequently inimical to the virus. It was therefore necessary to separate the virus from the fluid. It is claimed that this was found to be possible by prolonged centrifuging at high speed.

With the sediment so obtained tubes of culture media were inoculated and it is claimed that cultures were obtained. These were carried on in sub-cultures and the virulence of these was tested by guineapig inoculation. One strain was carried through 23 generations and another through 5.

GINS (H. A.) & FORTNER (J.). **Experimentelle Maul- und Klauenseucheinfektion und -immunität beim Meerschweinchen auf dem Fütterungs- und Luftwege.** [The Infection of Guineapigs with Foot-and-Mouth Disease and their Immunization against it by the Alimentary and Respiratory Tracts.]—*Zeitsch. f. Hyg. u. Infektionskrankh.* 1924. Nov. Vol. 103. No. 4. pp. 699–704.

In view of the ease with which foot-and-mouth disease spreads among cattle, and the readiness with which guineapigs may be infected experimentally, it is remarkable that the disease does not spread among guineapigs by contact. The authors have carried out experiments with a view to ascertaining whether it is possible to infect guineapigs either by the alimentary or respiratory tracts.

In the first experiments a dilution of infective lymph was introduced into the stomach by means of an elastic catheter passed down the oesophagus. Of 12 guineapigs treated in this way, 2 developed foot-and-mouth disease lesions, the period of incubation being 12 days. Two others although they showed no signs of infection were subsequently found to be immune.

It was desired to ascertain whether the virus entered the blood in the infective or in the immunizing form by daily inoculations of other guineapigs, but shortage of guineapigs prevented this from being carried out. Six guineapigs which failed to become infected also acquired no immunity.

For infection via the respiratory tract three methods of injection were used. It was introduced into the nasal cavity either as a spray or by means of a capillary tube, but by these methods there could be no guarantee that it did not reach the alimentary tract. In later experiments, therefore, it was introduced into the trachea direct. The results obtained showed that typical foot-and-mouth disease could be produced in guineapigs by direct spraying of the infective material on to the nostrils. The course of the disease in such cases

resembles that produced by intravenous injection, that is to say, the aphthae appear simultaneously; at least there are no primary vesicles on the tongue or buccal mucous membrane. In one instance inhalation of virus produced very strong immunity. In five cases neither infection nor immunity resulted. The direct introduction of the virus into the trachea failed to set up infection or to produce immunity, and it would thus appear that the virus does not gain entry to the body by way of the epithelium of the lower parts of the respiratory tract.

Of four animals treated by the introduction of the virus into the nose, one developed the typical disease, one was firmly immunized, and the remainder did not react in either way. It is thus established that guineapigs can contract foot-and-mouth disease by way of the alimentary or respiratory tracts, but it is probable that this does not occur under natural conditions because the quantity of virus taken in is too small to set up either infection or immunity.

The question of the natural method of infection in cattle remains unsolved.

BEATTIE (J. M.) & PEDEN (D.). **Rats as Possible Carriers of Foot-and-Mouth Disease.**—*Jl. Path. & Bact.* 1924. Oct. Vol. 27. No. 4. pp. 415–424. With 4 figs.

The authors describe certain lesions of the feet, tongue and lungs which developed in rats inoculated from lymphatic glands taken from carcasses of cows slaughtered because they had been in contact with foot-and-mouth infected animals. They were unable to supply evidence that the disease was actually foot-and-mouth disease as they were unable to carry inoculation experiments out upon cattle.

The lesions found included vesicles and ulcers on the feet and tongues. Glandular lesions took the form of caseous degeneration.

REMLINGER (P.). **Sur un virus de rue renforcé recueilli au Maroc.** [A Reinforced Strain of Street Virus obtained in Morocco.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 538–539.

It is well known that the virus of rabies is very variable in virulence. Subdural inoculation of the rabbit usually causes death in about a fortnight, but the period may be shorter or considerably longer. Strong viruses may cause death on the 7th or 8th day, and when passed on in rabbits death constantly occurs after the same interval. They thus behave like fixed virus. Such cases are rare, and have been observed chiefly in Italy.

The virus obtained in Morocco had the following history:—

A fox, eighteen months old, had been in Tangier for about a year. It was born at Saffi, in Morocco. Once arrived in Tangier it had not left it again. The fox was found one day to have a bleeding wound on its nose. Three or four weeks later the typical symptoms of dumb rabies developed. Death occurred on the fourth day.

An emulsion of the medulla was used for subdural inoculation of a rabbit and rabies developed on the 8th day, with death on the 9th. The brain of this rabbit was used for the inoculation of a second. The disease appeared on the 6th day and death occurred on the day following. Eight subsequent passages were carried out and death

occurred in all between the 6th and 8th days; there being one day's interval on every occasion between the appearance of symptoms and death. The virus would therefore appear to possess an exalted virulence. Naturally attenuated viruses have never been encountered by the author in Tangier.

GALLEGO (Abelardo). **Contribución al diagnóstico histológico de la rabia. Método rápido, sencillo y seguro para la coloración de los corpúsculos de Negri en los cortes.** [The Histological Diagnosis of Rabies. A Rapid, Simple and Certain Method of Staining Negri Bodies in Sections.]—*Rev. de Hig. y Sanidad Pecuarias.* 1924. Aug. Vol. 14. No. 8. pp. 499–502. With 2 figs.

The steps of the procedure are as follows:—

1. Fragments of the brain tissue, about 5 mm. thick, are fixed by boiling in 10 per cent. formaldehyde for 1–5 minutes.
2. Sections, 10–20μ thick, are then cut by the freezing microtome and treated for half-a-minute in solution by (*a*) distilled water 10 cc., nitric acid 1 drop, liq. ferri perchlor. diluted 1 in 10, 1 drop.
3. Without washing, the section is stained for 5 minutes in solution (*b*) diluted 7·5 in 100: distilled water 10 cc., Ziehl's carbol fuchsin 15 drops, acetic acid 1 drop.
4. Wash in water and treat for 5 minutes with (*c*) distilled water 10 cc., formol 2 drops, nitric acid 1 drop, liq. ferri perchlor. (diluted 1 in 10) 1 drop.
5. Wash in water and stain for one minute in (*d*) equal parts of 10 per cent. watery indigo carmine and saturated watery picric acid.
6. Wash, dehydrate, clear in carbol xylol, and mount in Canada balsam.

The nuclei of the cells are coloured violet, the protoplasm blue or greenish-blue, the ground substance of the Negri bodies green or greenish-red, their internal structure very pale violet. The whole process occupies only 20 minutes and the time may be even further reduced by using 30 drops of the fuchsin in stage 3 and staining for one minute only, and treating in stage 4 for one minute instead of five, but "these preparations have not the beauty of those made by the former detailed method."*

MICHALKA (J.). **Die Diagnose der Wut bei Tieren.** [The Diagnosis of Rabies in Animals.]—*Seuchenbekämpfung.* 1924. Vol. 1. No. 5-6. pp. 147–152.

This paper is a summary of the possible methods of diagnosis of rabies in animals which are applicable ante- and post-mortem. It contains nothing new.

PFEILER. **Bemerkungen zu verschiedenen Seuchenfragen, insbesondere zür Züchtung des Erregers der Maul- und Klauenseuche.** [Observations on Epidemics, particularly in connection with Foot-and-Mouth Disease.]—Reprint from *Der Praktische Landwirt.* 1924. June 6. No. 23.

---

* Summarized by Dr. H. Harold SCOTT.

MISCELLANEOUS.

ZWICK (W.) & SEIFRIED (O.). **Untersuchungen über die in Hessen gehäuft auftretende Seuchenhafte Gehirn- und Rückenmarksentzundung (Bornasche Krankheit) bei Pferden.** [Investigations in connection with the So-called Borna Disease of Horses.]—*Berlin. Tierärzt. Wochenschr.* 1924. Aug. 29. Vol. 40. No. 35. pp. 465–471.

The disease has a rather wide distribution in Germany, but no references to its occurrence in Hesse have as yet appeared in the literature.

The disease as it occurs in Hesse presents the same picture as in other parts of the country.

Post-mortem examination reveals no macroscopic lesions save some hyperaemia of the cerebral convolutions. Actual haemorrhages have not been observed in either the substance of the central nervous system or in the meninges.

Microscopic examination reveals vascular and perivascular infiltrations in the brain and spinal cord with rounded cells. These lesions are more numerous in the anterior part of the brain, and gradually become more scanty as one examines the more posterior parts. It has been suggested that this is an indication that infection is by way of the nasal cavity.

Zwick and Seifried have found cellular infiltrations along the course of the optic nerve.

The authors are able to confirm JOEST'S statement that cell inclusions, which are perhaps of a specific nature, occur in the large ganglion cells in the brain, *e.g.*, Amnion's horn, etc. It is noted that these may not be detected if the material examined is not fixed while in fresh condition. The inclusions appear to degenerate rapidly. These bodies were found by JOEST in an intranuclear position. Zwick and Seifried have seen them in extra-nuclear situations. An attempt was made to transmit the disease to a horse experimentally, but without success.

The cause of the condition has not been identified with certainty.

LOTHES & PROFÉ. **Zur Aetiologie der Dürener Krankheit.** [The Cause of Düren Disease.]—*Berlin Tierärzt. Wochenschr.* 1924. Sept. 19. Vol. 40. No. 38. pp. 513–519.

The authors are of the opinion that the cause of this condition is in some way connected with the use of trichlorethylene for the extraction of soya beans, but they admit that they cannot state conclusively that this is so.

GRATIA (A.) & RHODES (B.). **Production d'Anticorps bacteriolytiques et hémolytiques par la voie cutanée.** [The Production of Bacteriolytic and Haemolytic Antibodies by the Cutaneous Path.]—*C. R. Soc. Biol.* 1924. Oct. 7. Vol. 91. No. 28. pp. 797–798.

The authors have repeated the experiments of CIUCA and BALTEANU regarding the protection of guineapigs against cholera by the intraperitoneal and cutaneous paths.

These authors were unable to demonstrate antibodies in the serum of the later amnials. Gratia & Rhodes find no differences in the immunities possessed by the two groups.

MEYER (S.). **Die Blutmorphologie einiger Haus- und Laboratoriumstiere unter physiologischen und pathologischen Bedingungen.** [The Morphology of the Blood of Certain Domesticated and Laboratory Animals in Health and Disease.]—*Folia Haematologica.* 1924. Aug. Vol. 30. No. 3. pp. 195–229. With 2 plates in colour.

By examining the blood of a total of 173 animals, the author has added to our knowledge regarding the corpuscular elements in the blood of the horse, ox, dog, ass, pig, guineapig, rabbit, mouse and fowl. Some of the animals were normal and some diseased. For detailed reference the original paper should be consulted.

BOITEUX (R.). **Description d'une conserve à bouillon stérile non scellée à la lampe.** [An Apparatus for Storing Broth in a Sterile Condition.]—*Ann. Inst. Pasteur.* 1924. Oct. Vol. 38. No. 10. pp. 873–878. With 2 text figs.

The author figures and describes an apparatus in which broth can be stored in a sterile condition, but which allows quantities to be withdrawn as required without risk of contaminating the remainder. Since detailed description is requisite for the clear understanding of the apparatus it is impracticable to make an abstract of any value.

GERNEZ (C.). **Contribution à l'étude de la cuti-immunisation. Production d'anticorps par inoculation cutanée.** [The Production of Antibodies in Immunization by the Cutaneous Path.]—*Ann. Inst. Pasteur.* 1924. Oct. Vol. 38. No. 10. pp. 892–908.

With a view to throwing light upon the question of the presence or absence of antibodies in the general circulation of animals immunized by the cutaneous path, the author has carried out a number of experiments using blood corpuscles as his antigen. These were convenient to work with for the reasons that haemolysins are readily detected, dosage can be accurately graduated, their composition is constant, and penetration of the skin can be verified readily by histological examination. The rabbit was selected as the experimental animal for the reason that so many accounts have been published regarding the production of haemolysins in this species by subcutaneous, intravenous and intraperitoneal inoculation that there would be plenty of control records to check the results of intradermal inoculation against; the corpuscles used have been those of the goat and of man. It is easy to produce anti-goat haemolysins in the rabbit, but antihuman haemolysins are far less readily produced. Rabbit serum not infrequently contains anti-goat haemolysin, but very rarely anti-human haemolysin.

The corpuscles have been used for inoculation into the dermis and have also been applied as a dressing on shaven areas of skin. The later method is called epidermic inoculation by the author.

CANHAM (A. S.). **Ophthalmia of Sheep.**—*S. Africa. Jl. Dept. Agric.* 1924. June. Vol. 8. No. 6. pp. 581–582.

Ophthalmia of sheep is exceedingly infectious; great care therefore should be exercised in isolating all animals showing lachrymation.

Treatment is best carried out by instilling the following solution into the eyes with a fountain pen filler :—

Formalin	...	...	...	...	...	4 drachms.
Tinct. opii		...	...	...	...	1½ drachms.
Aqua	...	...	...	...	...	1 pint.

This should be used once daily while lachrymation persists.

Should ulceration occur, the solution used should be a 2 per cent. solution of hyposulphite of soda, to which tincture of opium has been added in the proportion of 10 minims per ounce.

After lachrymation a mixture containing equal parts of 1 per cent. atropine sulphate and 4 per cent. alum should be used to clear up the opacities that may be left.

Sheep apparently cured should be kept away from the healthy animals and carefully examined at short intervals for a fortnight.

MARSH (C. W.) & CLAWSON (A. B.). **The Meadow Death Camas (*Zygadenus venenosus*) as a Poisonous Plant.**—*U.S.A. Dept. Agric. Bull. 1240.* 1924. June 27. pp. 1–13.

Four species of *Zygadenus* occur in the Western States, and in the literature regarding poisonous effects there has been some confusion between them.

Sheep are the principal victims, but horses are not infrequently poisoned by it. The plant is toxic for cattle, but pigs probably escape through vomiting. *Z. venenosus* is probably of equal toxicity to *Z. gramineus* and these are many times more toxic than the other two species, *Z. paniculatus* and *Z. elegans.*

While the toxic doses of *Z. venenosus* and *gramineus* are about the same, the lethal dose of the latter is much smaller.

While the toxic dose of *Z. venenosus* is much smaller than that of *Z. paniculatus*, the lethal dose is about the same.

The symptoms are salivation, nausea, weakness, depression of temperature, and may be expected to appear on an average about two hours after the ingestion of the plant.

The principal organ affected is the kidney, where there is acute parenchymatous nephritis. It is noted, however, that only one animal was subjected to post-mortem examination.

The toxic dose of the plant for the sheep appears to vary from 0·3 lb. per 100 lb. body weight upwards.

GUNN (J. W. C.). **Slangkop Poisoning.**—*S. Africa. Jl. Dept. Agric.* 1924. Aug. Vol. 9. No. 2. pp. 141–142.

Slangkop is a name applied to different plants, but all belong to the Liliaceae. All that have been examined have the same action.

KENYA. **Report of the Proceedings of the Fifth Pan-African Veterinary Conference held at Nairobi, April 6th to 14th, 1923.**—pp. 128+2. With 9 illustrations. 1924. Nairobi: Govt. Press.

The Chairman proposed that the meetings should, as far as possible, take the form of a round-table gathering, delegates being permitted freedom of speech and questioning.

The proceedings were in the nature of a debate, papers in the ordinary sense of the term not being read.

The subjects dealt with were (*a*) Specific Diseases: (1) Pleuro-pneumonia; (2) Rinderpest; (3) East Coast Fever, Tick Destruction and Tick-borne Diseases; (4) Trypanosomiasis and Tsetse Bionomics; (5) Horse-sickness; (6) Anthrax; (7) Black-quarter; (8) Gallamziekte; (9) Contagious Abortion; (10) Avian Diseases; (11) Helminthiasis; (12) Skin Diseases; (13) Plant Poisoning; (14) Ulcerative Lymphangitis; (15) Swine Fever; (16) Rabies. (*b*) Pathological Research. (*c*) Disease Control. (*d*) Grazing and Water Facilities. (*e*) Stock Improvements. (*f*) Stock Economics.

Delanoë (P.). **Les diverses espèces de rats constatées dans les Doukkala et plus particulièrement à Mazagan. De la rareté du surmulot.** [The Species of Rats found in Doukkala, and particularly in Mazagan. The Rarity of the Norwegian Rat.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 584–589.

——. **Du nombre des mamelles chez le Rat d'Alexandrie.** *E. rattus* **var.** *alexandrinus* **G.** [The Number of Mammae in the Alexandria Rat, *E. rattus* var. *alexandrinus* G.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 589–590.

Levaditi (C.), Nicolau (S.) & Schoen (R.). **L'étiologie de l'encéphalite épizootique du lapin, dans ses rapports avec l'étude expérimentale de l'encéphalite léthargique.** *Encephalitozoon cuniculi* **(nov. spec.).** [The Causation of Epizootic Encephalitis in the Rabbit and its bearing upon the Experimental Investigation of Lethargic Encephalitis. *Encephalitozoon cuniculi*, n.sp.]—*Ann. Inst. Pasteur.* 1924. Aug. Vol. 38. No. 8. pp. 651–712. With 2 plates & 18 text-figs.

Stassano (H.). **De la stérilisation des liquides en circulation continue, sous couche mince. Évolution de la méthode et transformation successive des appareils.** [The Sterilization of Liquids in their Layers, and the Evolution of the Method.]—*Ann. Inst. Pasteur.* 1924. May. Vol. 38. No. 5. pp. 427–448.

REPORTS.

Rhodesia, Northern. **Report of Chief Veterinary Officer for the Year ended March, 1924.** [MS. received through the Colonial Office.]

Rinderpest and foot and mouth disease are not known to exist. East Coast Fever, which has recently gained admittance, is confined to a district almost entirely surrounded by a fly belt. Pleuro-pneumonia has been eradicated from all parts with the exception of Barotseland.

The heaviest mortality is from anthrax. Very few districts are free from contagious bovine abortion. Headway is being made among European owned cattle in dealing with this disease. The policies of segregation and vaccination are both being tried. Many owners have used living vaccine on all female animals whether pregnant or not, and though a considerable number of pregnant animals aborted, the calf crops of the following year have been very good.

" Sweating sickness " in calves has been diagnosed for the first time. Cysticercus cellulosae is a very commonly occurring parasite of the pig and is of great economic importance. A disease termed tick pyaemia

is described as occurring in horses. It is characterized by the development of an abscess at the place where a bont tick has attached itself, this being followed by the development of abscesses all over the body. An attempt is being made to prepare an autogenous vaccine.

Horse sickness has been very prevalent.

Trypanosomiasis.—In using antimony tartrate for the treatment of trypanosomiasis the two Veterinary Officers in charge of the work use the posterior auricular vein in preference to the jugular for intravenous injections.

The results of treatment have varied. Sometimes improvement has been seen at once, at others it has been delayed. In a few cases death has followed the injections very promptly.

Abortion has been a not infrequent sequel to the injections.

Some animals appear to be antimony proof.

The Report contains a preliminary account of work done in connection with the so-called veld poisoning; as yet nothing very definite has emerged.

RHODESIA, SOUTHERN. **Report of the Chief Veterinary Surgeon for 1923.**—*Rhodesia Agric. Jl.* 1924. Aug. Vol. 21. No. 4. pp. 413–423.

The year was marked by an extensive spread of African Coast fever in the Charter District, and by a heavy mortality from horse sickness in all districts.

In connection with African Coast fever it is noted that when cattle are kept on infected veld and dipped every third day with the object of eradicating infection the mortality gradually decreases towards the end of the year, and invariably increases during the first few months of the following year. This is probably due to rains interfering with the efficacy of the dipping, but it does not appear to result in the dissemination of fresh infection, as in most cases mortality ceases within twelve months of the institution of three day dipping. Forty fresh centres of contagious abortion were discovered during the year. Vaccination with living or with " devitalized " vaccine was carried out in some cases, but no exact figures of the results are available. On one of the larger ranches 400 heifers were inoculated with live vaccine, and 3,000 with devitalized vaccine. The management reported no increase in the calf crop, nor did the vaccinated herds have a larger percentage of calves than the untreated.

RHODESIA, SOUTHERN. **Report of the Director of Veterinary Research for 1923.**—*Rhodesia Agric. Jl.* 1924. Aug. Vol. 21. No. 4. pp. 424–431.

The Director of Research calls attention to the criticism made elsewhere of the devitalized vaccine, and points out that in the absence of detailed information on many points, the vaccine cannot be condemned as a failure.

The death rate from horse sickness was about 34 per cent.

BOOK REVIEW.

REEKS (H. Caulton). [F.R.C.V.S.] **Diseases of the Horse's Foot.**—Second Edition. pp. xii+568. With 193 figs. 1925. London: Baillière, Tindall & Cox, 8, Henrietta Street, Covent Garden, W.C. 2. [Price 21s.]

Nearly twenty years have elapsed since the first edition of this work appeared. It is a long interval, but it has been amply justified by the improved quality of the second edition, which is bound to enhance the reputation of the author for mature and reliable information on the diseases of the horse's foot. The anatomy and physiology of the foot, its conformation, method of examination, and the various operations that may be performed upon it are carefully described. A very full account is given of the diseases of the hoof-forming membrane, lateral cartilages, bones and joint of the foot, with all important details of treatment. In his observations the author is not dogmatic, and on points which are open to differences of opinion or of practice he is careful to state the published views of the better known authorities. Objection may be taken to the inclusion of so many reports of cases and their treatment, which in some instances appear to have no particular value, and of which at least one (p. 339) would seem to require further investigation.

J. Macqueen.

TROPICAL DISEASES BUREAU.

TROPICAL VETERINARY BULLETIN.

VOL. 13.] May 30, 1925. [No. 2.

DISEASES DUE TO PROTOZOAN PARASITES.

VAN SACEGHEM (R.). **Effets de l'inoculation de sang contenant des toxines trypanosomiques, dues à** *Trypanosoma congolense pecorum*, **sur les infections du** *Trypanosoma cazalboui* **var.** *vivax*. [The Effects of Inoculating Blood containing Trypanosome Toxins due to *T. congolense pecorum* on Infections caused by *T. cazalboui* var. *vivax*.]—*Bull. Agric. Congo Belge.* 1923. Dec. Vol. 14. No. 4. pp. 608–609.

In cases in which cattle are infected simultaneously with *T. congolense* and *T. cazalboui* the latter always disappears from the circulation, while *T. congolense* persists, according to the author, and this, he believes, indicates an antagonism between the two.

He has inoculated intravenously cattle infected with *T. cazalboui* with large quantities (one litre) of blood containing *T. congolense*, the trypanosomes having been previously killed by the addition of a trace of emetic. Such injections cause a rapid disappearance of *T. cazalboui* from the circulation, but they reappear after several days.

To make quite sure that this result is not due to the emetic the defibrinated blood has been allowed to stand for 12 hours after the addition of the drug, which during this period undergoes decomposition, producing substances devoid of trypanolytic power. Blood similarly treated failed to cause any disappearance of trypanosomes when injected into animals infected with *T. congolense*.

Repeated injections cause the disappearance of the parasites from the circulation. If an interval of 20 days is allowed to elapse between injections anaphylactic shock is produced.

VAN SACEGHEM (R.). *Trypanosoma congolense* **dans l'Est Africain.** [*Trypanosoma congolense* in Ruanda.]—*C.R. Soc. Biol.* 1924. Dec. 27. Vol. 91. No. 37. pp. 1455–1456.

After summarizing very briefly the literature regarding the animals susceptible to inoculation with *T. congolense* van Saceghem gives details of four dogs which he inoculated with the parasite. The strain used was of bovine origin.

(K2590) Wt P158/184 700 5/25 H & Sp Gp 52 5

Dog No. 1. Was infected, but apparently made a complete recovery, and was re-infected.

Dog No. 3. Trypanosomes appeared in the blood about a month after inoculation, and death occurred a month later.

Dog No. 2. Was inoculated from Dog No. 1. The period of incubation was nine days, and death occurred on the 13th day after the appearance of trypanosomes.

Dog No. 4. Inoculated from Dog No. 1. Parasites appeared on the 19th day and death occurred a month later. In both of these animals (2 and 4) there was enormous enlargement of the spleen, and petechiae were found on the peritoneum.

VAN SACEGHEM (R.). **La formol-gélification et le diagnostic des trypanosomiases chez les bovidés.** [The Formol-Gel Test for the Diagnosis of Trypanosomiases in Cattle.]—*C. R. Soc. Biol.* 1925. Jan. Vol. 92. No. 3. pp. 193–195.

Van Saceghem gives tabular statements showing the results of adding 2 drops of commercial formalin to 1 cc. of serum obtained from infected and healthy cattle.

The sera from cattle which were believed to be healthy gelled in periods ranging from 25 minutes to 7 days. Bovines infected with *T. congolense* and *T. cazalboui vivax* yielded sera which was gelled by formalin in periods ranging from 1 hour to a maximum of 9½ hours.

The author concludes that his results are in agreement with those obtained by HORNBY.

ILOWAISKY (S. A.) & STIEBEN (W. D.). **"Su-aurù" Trypanosomose bei Kamelen u. Pferden in der Kirgisensteppe u. im Uralgebiete.** ["Su-aurù"—Trypanosomiasis of the Camel and Horses on the Khirgiz Steppes and the Ural Area.]—*Rev. de Microbiol. et d'Epidémiol.* 1923. Vol. 2. No. 1/2. pp. 93–95; and 1924. Vol. 3. No. 3. pp. 222–223.

The authors' observations were made during an epidemic in 1922, when hundreds of animals died, but the occurrence of trypanosomiasis on the Steppes has been recognized for many years. The name "su-aurù" means "water disease," it being held to be due to the drinking of dirty water. It has also been said to be caused by a certain kind of grass.

One of the most characteristic symptoms is swelling of the inferior cervical lymphatic glands, although it is difficult to ascertain the size of these when they are normal. A subacute and a chronic form of the disease are recognized.

Experiments indicated that the disease in the horse and camel were identical.

In experimental infections the period of incubation ranges from 2 to 10 days, depending upon the amount of virus used and the species of animal from which it is taken. The course of the disease is usually rapid and death takes place after a short time. A painful swelling generally develops at the seat of inoculation, and this persists for three or four days. It was never found possible to detect trypanosomes in the enlarged glands prior to their appearance in the blood stream. Daily examinations of the blood showed that trypanosomes persisted

there from the time of their appearance until death took place. The original swelling of the cervical glands was very marked, but this was soon reduced in amount, but there was some degree of permanent swelling left. In experimentally-infected camels there was not always observed oedema. In all cases purulent conjunctivitis was observed. At the post-mortem examination of experimentally-infected camels no very distinct lesions were found.

ILOVAISKY (S.). **Su-auru der Pferde.** [Su-auru in the Horse.]—*Arch. f. Schiffs- u. Tropen-Hyg.* 1924. Dec. Vol. 28. No. 12. pp. 535–538.

In the first case of the disease—a trypanosomiasis of camels and horses in Kirghiz and Ural—the only symptoms observed were diarrhoea and wasting, and nothing at all indicative of trypanosomiasis. Investigations carried out in 1923 shewed that the percentages of camels and horses infected were 8·82 and 4·25 respectively in Kirghiz, but in the Ural area these percentages were 28·6 and 70·7.

As a result of extensive investigations the author formed the following views regarding su-auru in horses. The course of the disease is divisible into two distinct periods, and it is only during the second of these that definite symptoms are presented. The symptoms are: wasting, irregular fever, purulent conjunctivitis and keratitis, and jaundice. Oedema is not observed as a rule. The disease runs its course in six months to a year, and spontaneous recovery does not appear to take place. The disease appears to be distinct from surra.

WALRAVENS (P.). **Note concernant des cas de trypanosomiase chez le porc produits par le** *Trypanosoma rodhaini* **(n.sp.).** [Cases of Trypanosomiasis in Pigs caused by *T. rodhaini* (n.sp.).]—*Rev. Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 4.) 1923. Aug. No. 4. pp. 233–234.

The author describes a trypanosome found in the blood of pigs near Elizabethville in September, 1922.

The parasite was found to be incapable of infecting guineapigs and rabbits, but it was transmitted to a young pig.

The organism was distinguishable from *Cazalboui-vivax* morphologically and on the score of its feeble motility, which involved little or no translation. It appeared to differ from *T. simiae* by the invariable presence of a long free flagellum.

SERGENT (Edm.) & DONATIEN (A.). **Debab et nagana chez le dromadaire.** [Debab and Nagana in the Dromedary.]—*Arch. Inst. Pasteur d'Algérie.* 1924. June. Vol. 2. No. 2. p. 162.

In a brief note the authors describe two experiments in which two dromedaries were inoculated with MESNIL'S strain of *T. brucei*. Both of these animals had previously been infected with Debab. One had apparently made a complete recovery, while the other occasionally showed trypanosomes in its blood. Both animals showed febrile

attacks after a period of five or six days, and trypanosomes appeared in the blood in considerable numbers.

The authors conclude that the trypanosomes are not identical, and also that the North African dromedary is susceptible to nagana.

SERGENT (Edm.), DONATIEN (A.), & DEGUILLAUME (A.). **Notes sur le Debab, trypanosomiase des dromadaires : évolution, influence sur la gestation, prémunition.** [The Evolution of Debab and its Influence on Gestation in the Dromedary. Immunization.]—*Arch. Inst. Pasteur d'Algérie.* 1924. June. Vol. 2. No. 2. pp. 147–157.

During the incubative stage of infection abortion may occur, but in the acute stage abortion or the slipping of a dead foal always occurs. During the chronic phase accompanied by immunization (prémunition) foaling may be normal, but in some cases the foal dies.

The degree of immunity acquired protects dromedaries from re-infection, but it is not hereditary.

SERGENT (Edm.) & DONATIEN (A.). **Existence aux confins algéro-marocains de l'infection équine due à *Trypanosoma marocanum* et considérations, à ce propos, sur l'épreuve des réinoculations croisées de Laveran et Mesnil.** [An Equine Infection in Morocco and Algeria due to *T. marocanum* and the Bearing of this upon the Cross-Immunity Test of Laveran and Mesnil.]—*Arch. Inst. Pasteur d'Algérie.* 1924. June. Vol. 2. No. 2. pp. 158–161.

The trypanosome was obtained for the experimental work from a guineapig inoculated from an infected horse in the Oudjda area.

A sheep was infected with *T. marocanum*, and by means of treatment with tartar emetic it was brought through the infection. The blood was infective for dogs up to 7 months after, but not at 13 months. Four months later it was given a second inoculation of virus. The sheep showed no clinical evidence of infection, but its blood was proved by the inoculation of dogs to contain trypanosomes. The sheep was therefore " prémunised " but not immunized. A third injection of virus was given seven months after the second. The blood failed to infect two dogs inoculated 24 days later. The sheep was now immune to the *T. marocanum*. Two months later it was injected with the Oudjda virus, but it failed to become infected. A second injection was given four months later. After this two dogs inoculated from it failed to become infected.

A parallel experiment was carried out with a goat.

In a third experiment a sheep was immunized against the Oudjda virus, and then inoculated with *T. marocanum*. The inoculation failed to infect.

The conclusions drawn are : That the trypanosomes occurring in horses in Eastern and Western Morocco are identical ; that it is wise in experiments of this kind to repeat the inoculations conferring the first immunity so as to make sure that the condition of " prémunition " is passed, and that of actual immunity established, before the cross test is carried out.

Sheep and goats, which are less susceptible to trypanosomiasis than the dromedary, may pass through the successive phases of infection and prémunition, and achieve complete immunity. The last of these is acquired in about two years. Its duration is not known.

LETONTURIER, DE MARQUEISSAC, & JAMOT. **La prophylaxie de la maladie du sommeil au Cameroun dans les secteurs du Haut Nyong et de Doumé.** [Sleeping Sickness Prophylaxis in the Cameroons.]—*Ann. Inst. Pasteur.* 1924. Dec. Vol. 38. No. 12. pp. 1053–1100.

Haut-Nyong and Doumé have been sleeping sickness centres for many years, and it is exceptionally contagious on account of the density of the population. There is little tendency to regression save in one area of the Doumé district, where it has practically disappeared. While the disease is not so fatal as in some parts of equatorial Africa, it is a serious factor in depopulation.

In dealing with the disease prophylactically detailed information is essential, and this can only be obtained by complete investigations in all the endemic or suspected areas. When the areas have been definitely located they must be circumscribed. All movement must be carefully controlled, and the infected must be prevented from going to clean areas.

Examination by lumbar puncture shows that approximately half the infected are in the first stage of the disease, and therefore curable. Efforts should be concentrated upon these cases, but to achieve success the work must be carried on assiduously for many years.

BATTAGLIA (M.). **Metodo per colorare i tripanosomi nei tessuti fissati.** [The Staining of Trypanosomes in Fixed Tissues.]—*Pathologica.* 1925. Jan. 1. Vol. 17. No. 387. p. 23.

The sections are stained for two hours in carbol gentian violet and then passed into iodine solution (Gram's) where they remain for an hour. Decolorization is then effected by absolute alcohol.

VELU (H.), BAROTTE (J.), & LAVIER (G.). **Le Bayer 205 dans la thérapeutique des trypanosomoses animales au Maroc.** [" Bayer 205 " in the Treatment of Animal Trypanosome Infections in Morocco.]—*Ann. Parasit. Humaine et Comparée.* 1925. Jan. Vol. 3. No. 1. pp. 1–11.

The bulk of this paper is made up of detailed accounts of animals subjected to treatment with " Bayer 205." Two animals—a horse and a dog—were inoculated experimentally with *T. marocanum.*

The dog, which weighed 2·5 kilogs., was given two injection of 0·5 g. of the drug 7 weeks and 10 weeks after it was inoculated and when infection was well established. Recovery took place.

The horse, which had been treated for dourine, and had made an apparent but not an actual recovery, was also inoculated with *T. marocanum.* It received a dose of 5 g. six weeks after inoculation. During the next six months the animal wasted a great deal and a month later trypanosomes were found in the blood. Two doses of " Bayer 205 " (5 g. and 2 g., at an interval of 24 hours) failed to effect a cure, and death took place. Six naturally contracted cases of dourine were treated. Seven grammes of the drug were given intravenously in two doses, at an interval of 48 or 72 hours. Three animals

showed toxic symptoms, and one died. In two instances the occurrence of oedema intermittently made it doubtful whether recovery had actually taken place, and in one case there was apparently a complete cure.

VELU (H.), BAROTTE (J.), BALOZET (L.), & LAVIER (G.). **Au sujet d'accidents consecutifs aux injections de Bayer 205 chez des étalons dourinés.** [Ill-Effects noted in Stallions infected with Dourine as the Result of Treatment with "Bayer 205."]—*Ann. Parasit. Humaine et Comparée.* 1925. Jan. Vol. 3. No. 1. pp. 12–20. With 1 text fig.

The stallion which died (see above) developed oedematous swellings on all parts of the body, ranging from a nut to an egg. They resembled in appearance the generalized subcutaneous sarcomata seen in horses, although they were softer to the touch. Oedema was particularly marked over the parotid region and lips, nares, and chin. The symptoms in the non-fatal cases were similar, but less pronounced. After the lapse of 36 to 48 hours the patches of oedema disappeared and gave place to erythema. Prostration was very marked, and the animals showed an intense desire to bite such parts as they could reach. In some cases a papular or vesicular eruption occurred. There was no rise of temperature. Appetite was entirely lost, and the animal became reduced to a skeleton. Bed sores developed rapidly. At the post-mortem the muscular tissue had the appearance of "fevered flesh." The liver was slightly enlarged, of a pale yellow colour, and was readily torn. The other organs showed only marked congestion of the vessels. The blood was imperfectly coagulated. The congestion of the vessels was the most striking feature.

This lesion led the authors to try the effect of subcutaneous injections of adrenalin. Twelve cubic centimetres were given in the evening after the "205" had been given in the morning, and three further injections of 10 cc. were given morning and evening. One stallion which recovered developed a curious lesion: this was an elongated area of oedema running down from the croup towards the hip in a symmetrical manner on each side. These areas were observed in the morning and gradually became less marked during the day. This was observed daily, but becoming increasingly indistinct for about a week. Subsequently there was an abundant desquamation of epithelium over these areas, and a growth of white hairs.

The authors review at some length the possible explanations of the toxic effects of the drug in these cases.

ILOWAISKY (S. A.) & ZEISS (H.). **"Bayer 205" bei experimentalem Su-aurù von Kamelen.** ["Bayer 205" in the Treatment of Experimental Su-aurù in the Camel.]—*Rev. Microbiol. et Epidémiol.* 1923. Vol. 2. No. 1/2. p. 95.

This brief note is in the nature of a preliminary publication regarding the use of "Bayer 205" in camels affected with Su-aurù. In one instance a single intravenous injection of 3 grammes of the drug appeared to effect a complete cure, as the animal was kept under observation for five months in apparently perfect health. In another animal a relapse occurred one month after the first dose, but this was cut short by a second dose of 3 grammes.

For naturally-infected animals it is suggested that a first intravenous injection of 2–3 grammes should be given, followed by a second of 4 grammes subcutaneously after an interval of 8–10 days.

VAN SACEGHEM. **Le 205 Bayer (Naganol) et le traitement des Trypanosomiases animales.** ["Bayer 205" and the Treatment of Animal Trypanosomiases.]—*C. R. Soc. Biol.* 1924. Dec. 27. Vol. 91. No. 37. pp. 1452–1454.

Injections of "Bayer 205" render the blood incoagulable. The fatal toxic dose for cattle is 15 grammes per 100 kilog. live weight. At the post-mortem the principal lesions are found in the intestine and kidneys. In the treatment of sleeping sickness in man the use of the drug leads to improvement if it be used during the first or second stages, but it is not yet established whether a radical cure is effected. In the third stage of the disease no results are obtained.

In animal trypanosomiases the drug is valueless against *T. vivax*; of little or no value in equine surra. Dourine and mal de caderas may be favourably influenced by it.

Van Saceghem has tested it against *T. congolense*, but has not had very encouraging results.

The sample of the drug used was of a pink colour which, when dissolved slowly in distilled water (to make a 20 per cent. solution), yielded a pink solution which subsequently became dark red. All injections were made intravenously.

Animals infected experimentally with *T. congolense* were given the drug at the rate of 5 grains per 100 kilog. This produced a temporary clearing of the circulation, which lasted at the most for four weeks. Tolerance to the drug is readily established. When used for the treatment of animals infected with *T. vivax* in the same dose the circulation was cleared of trypanosomes for a maximum of seven days only.

SMILLIE (W. G.). **The Treatment of Mal de Caderas with Tryparsamide.**—*Jl. Amer. Vet. Med. Assoc.* 1923. Sept. pp. 19–33. With 3 text figs.

Mal de Caderas is the biggest economic problem of the Paraguay Valley. In some places ranches lose the whole of their horses each year.

Mules are less susceptible, and may recover, but it is said that no horse which has developed paresis ever recovers. It is believed that the disease is transmitted in Brazil by the tabanid *Lepidoselaga lepidota*. Variable results have been obtained with "Bayer 205." MIGONE reports encouraging results, but in Upper Paraguay it is found that the drug is toxic in effective doses (3 g. intravenously). Smillie has had the opportunity of trying tryparsamide on a ranch where the disease occurs endemically in its severest form. Owing to difficulties of transport in Western Brazil it was possible to study the effects of single doses given to a few cases at widely separated places.

Diagnosis was based upon the examination of a few drops of liquid from the leucocyte layer obtained by centrifuging citrated blood in a hand centrifuge for three minutes. No specimen was considered negative until it had been searched fruitlessly for half-an-hour.

Doses of 5 grammes to 8 grammes of the drug were dissolved in 20 cc. of normal saline and injected intravenously.

Details are given of the various animals treated.

The transmitting fly is prevalent during the period November to February, and as the author's tour was made in March and April only a few were seen. He formed the opinion that the fly is not a carrier of the infection from season to season, but acts as the transmitting agent during the hot weather. He does not think that the capybara acts as the reservoir for the virus for the reason that this animal inhabits the river banks, while horses are on upland pastures many miles from the rivers. He believes that the horse, and possibly also the mule, are the reservoirs of the virus.

The disease appears to pass through two phases. In the earlier phase there is invasion of the blood. There may be fever and some loss of weight, but the animal continues to work. At this phase there is a chance of effecting a cure, and it is this phase which is the chief source of danger.

The second phase is marked by invasion of the nervous system, and the development of paralysis. This phase is not of importance either from the prophylactic or the curative point of view. In this phase parasites have largely disappeared from the circulating blood, and the animals are therefore not a source of danger to the rest. Control depends upon early diagnosis, as horses may be infected for weeks or months during the slack season, but, nevertheless, they may show no symptoms until the stress of work is brought into play.

Two plans are suggested for the control of the disease.

A. Microscopic examinations of the blood of all horses between December and January each year. Place infected animals on short-grass pasture. The temperatures of all apparently healthy horses should be taken every fortnight from January 1st, and all animals showing a temperature of 102° to be subjected to another blood examination. Temperature taking to be continued until April 1st.

Infected animals to be given (intravenously) 8 to 10 g. of tryparsamide at intervals of 2 to 3 weeks. Healthy and treated horses may be brought to work with healthy animals from April 15th onwards. The difficulty of this plan is the necessity for skilled assistance in making the microscopic examinations.

B. The second plan, which obviates the necessity of microscopic examinations, is as follows :—

The temperature of all horses to be taken by December 15th. Animals showing a temperature of 102° or over to be isolated as suspicious. The temperature of these animals to be taken daily for five or six days. If the fever persists treatment should be resorted to. The temperatures of all horses to be taken once a fortnight, and all animals showing a rise to be treated as above.

Additional measures of a general nature are as follows :—

New horses should be bought from upland Caderas-free areas. It is unnecessary to carry out destruction of the capybara.

Horses should be kept away from brush and should be placed on short-grass pastures during the rainy season.

In the author's experiments it was found that 24 horses treated with two doses were still alive and well after nine months, while five untreated controls were all dead. No toxic effects were noted ; there was, in fact, a general improvement in condition.

Treatment is of very doubtful value once the nervous system has become involved.

CURSON (H. H.). **Nagana and the Tartar Emetic Treatment.**—*Jl. Dept. Agric. Union of South Africa.* 1924. Oct. Vol. 9. No. 4. pp. 363–369. With 1 plate.

After dealing briefly with the nature, symptoms and course of the disease, the author gives a more detailed account of the methods employed in treatment with tartar emetic :—

Adult cattle may be given 1·5 grammes daily for 5 days.

Horses, mules and donkeys may also be given doses of 1·5 grammes.

Dogs of 25 lb. weight may be given 100 to 125 mg. with safety.

Discretion must be used with regard to repetition of the dose. The drug is given as a 5 per cent. solution in water, and for large animals the jugular vein is selected. In dogs, the saphena vein is the vessel of choice.

Care must be exercised that none of the drug is placed under the skin, as suppuration will occur.

It is to be noted that the author groups together infections caused by *T. brucei*, *T. congolense*, and *T. vivax* as nagana, and that tartar emetic appears to be valueless for the treatment of *T. brucei* infection.

SERGENT (Edm), DONATIEN (A.), PLANTUREUX (E.), & DEGUILLAUME (A.) **Essais de traitement du Debab trypanosomiase des dromadaires. (3me Mémoire.)** [The Treatment of Debab in Dromedaries.]—*Arch. Inst. Pasteur d'Algérie.* 1924. June. Vol. 2. No. 2. pp. 166–177.

The authors give details of a considerable number of experiments in which emetic, atoxyl, either alone or in conjunction, novarsenobenzol, Product No. 189, trepol, oxycyanide of mercury, biniodide of mercury, salicylate of soda, sulphate of copper, and quinine were used.

As it is impracticable to make an abstract of the mass of figures given that would be of any value, the authors' conclusion may be quoted :—

The following drugs have been found to be very active against *T. berberum*, intravenous injections of a watery solution of emetic, and a combined method using emetic and atoxyl. In a single case an intramuscular injection of emetic in oil gave a result inferior to that given by the intravenous injections of watery solutions (7 cases). In two cases atoxyl was proved to be active, but the safety factor is too low. Novarsenobenzol appears to act like atoxyl, but is less toxic.

The following were found to be inefficacious : 189 (1 case), trepol (2 cases), oxycyanide of mercury (1 doubtful success out of two cases treated), biniodide of mercury (7 cases), salicylate of soda (2 cases), sulphate of copper (2 cases), and quinine (1 case).

GALLIARD (Henri). **Sur un cas d'infection à *Trypanosoma theileri* et *Piroplasma bigeminum*.** [A Case of Infection with *T. theileri* and *P. bigeminum*.]—*Ann. Parasit. Humaine et Comparée.* 1925. Jan. Vol. 3. No. 1. pp. 21–27. With 1 text-fig.

The trypanosome made its appearance in the blood of a cow inoculated experimentally with blood containing *P. bigeminum*, *P. argentinum*, and *Anaplasma marginale*.

NOGUCHI (H.) & LINDENBERG (A.). **The Isolation and Maintenance of Leishmania on the Medium employed for the Cultivation of Organisms of the Leptospira Group of Spirochetes.**—*Amer. Jl. Trop. Med.* 1925. Jan. Vol. 5. No. 1. pp. 63–67. With 1 plate.

Two strains of *Leishmania brasiliensis* have been isolated from lesions by cultivation in the following medium :—

0·9 per cent. saline	800 parts
Fresh rabbit serum	100 ,,
2·0 per cent. nutrient agar pH 7·2	100 ,,
Rabbit haemoglobin, made by laking 1 part of defibrinated blood with 3 parts of distilled water	10–20 ,,

The primary tubes were kept (through force of circumstances) for three weeks before subcultures were made. Sterile oil may be placed upon the surface of the medium to prevent evaporation. Primary tubes at room temperature yielded growths, but tubes kept at 26° C. failed.

HEUSER (G. F.). **Influence of Vitamines on Growth and Resistance to Coccidiosis.**—*Rel. Poultry Jl.* 31 (1924), No. 2. pp. 226, 228 & 232. [Ex. *Experiment Station Record.* 1924. Oct. Vol. 51. No. 6. p. 576.]

Experiments carried out with chicks led the author to the opinion that the addition of cod liver oil, green food and milk (skimmed) caused a great increase in weight and exalted the resistance of the chicks to coccidiosis.

NIESCHULZ (O.) **Zur Verbreitung von Isospora-Infektionen bei Hunden und Katzen in den Niederlanden.** [Isospora Infections of Dogs and Cats in Holland.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1925. Jan. 28. Vol. 94. No. 2. pp. 137–141. With 3 text-figs.

Nieschulz has examined the faeces and intestinal wall of 50 cats and 35 dogs for oocysts by Vajda's glycerin concentration method. *Isospora bigemina* was found in 1 cat, *I. rivolta* in 6 dogs and 6 cats, *I. felis* in 7 cats, and in 1 dog sporocysts of what is possibly a new species of Isospora.

In the latter case ripe free sporocysts were found in small numbers. These measured 14–17μ by 8–10μ. The spore membrane was double-contoured.

The dog had been dead one day before it was examined.

PÉRARD (C.). **Recherches sur les coccidies et les coccidioses du lapin.** [The Coccidia of the Rabbit.]—*Ann. Inst. Pasteur.* 1924. Nov. Vol. 38. No. 11. pp. 953–976.

As the result of his observations and experiments the author concludes that there are two coccidia commonly parasitic in the rabbit, *Eimeria perforans* which is responsible for the intestinal disease, and *E. stiedae*, which is the cause of hepatic coccidiosis. *E. perforans* measures on an average 25·5 by 15·5μ, and *E. stiedae* 37·5 by 21·5μ.

DE KOCK & QUINLAN. **A Short Preliminary Communication on Anaplasmosis of Sheep as observed in South Africa.**—*Bull. Soc. Path. Exot.* 1924. Oct. Vol. 17. No. 8. pp. 651–653.

Sheep at Onderstepoort subjected to splenectomy showed relapses to anaplasmosis with fever, icterus, and fairly acute anaemia.

Sheep from the Orange Free State showed no such relapses.

Anaplasmosis has been found as an independent specific disease in the sheep, and it has been maintained through six generations in sheep. It has been found impossible to transmit the infection from sheep to cattle by inoculation.

Similarly, experiments in which attempts were made to transmit bovine anaplasmosis to sheep have failed.

TORRES (C. M.). **Coccidiose, lésions de la moelle osseuse et réaction de Wassermann positive, non-spécifique, chez le lapin.** [Coccidiosis ; Lesions of the Bone Marrow and Non-Specific Wassermann Reaction.]—*C. R. Soc. Biol.* 1924. Oct. 31. Vol. 91. No. 30. pp. 986–987.

The author has examined a number of rabbits and finds a positive Wassermann reaction has no connexion with the existence of coccidiosis, as has been suggested, nor with oedema of the bone marrow. Oedema of the bone marrow with atrophy of the adipose cells is sometimes seen in rabbits. This in its turn is not connected in any way with coccidiosis.

SCHMIDT (J.). **Kokzidienbefunde bei Tieren und ihre Deutung.** [The Importance of Coccidia in Animals.]—*Berlin. Tierärzt. Wochenschr.* 1924. Dec. 26. Vol. 40. No. 52. pp. 753–755.

The author and his co-workers have examined the faeces of sheep, lambs and goats, and they find that apparently healthy animals may pass coccidia. They also find that oocysts are not invariably passed by animals harbouring the parasite.

GILBERT (S. J.). **A Case of *Theileria mutans* Infection (Egyptian Fever) in Palestine.**—*Jl. Comp. Path. & Therap.* 1924. Sept. Vol. 37. No. 3. pp. 158–160.

The infection occurred in a Dutch bull 2½ years old, which was born in Palestine, at Benyamina, in the northern part of the coastal plain. The principal ticks found are *B. annulatum* and *H. aegyptium*. Cases of *bigeminum* infection and anaplasmosis have been found in imported cattle there.

The symptoms noted were loss of appetite, feebleness of pulse and accelerated respiration. The temperature rose to 42° C., and there was lachrymation and enlargement of the lymphatic glands. Constipation yielded to treatment. There was no jaundice, but red urine was observated on two occasions. Death occurred on the 13th day after symptoms were first noticed.

Five grammes of trypanblue were given subcutaneously on the first day of illness and 2 grammes intravenously on the 11th day.

At the post-mortem examination the mucous and serous membranes were deeply stained with trypanblue. The carcase was oedematous. The blood clotted feebly and slowly. The duodenum contained a quantity of dark yellow fluid. The abomasum showed a number of erosions. The kidneys showed no infarcts, but were intensely stained

with trypanblue. The spleen was somewhat enlarged, reddish brown in colour and soft. There was pericarditis, and the pericardium contained about a pint of fluid. The lungs were oedematous and the bronchi contained frothy mucus.

Parasites were first seen in the blood on the 3rd day. A smear obtained on the 11th day showed about 50 per cent. of the corpuscles invaded. Multiple invasion up to 4 parasites was seen. Round forms slightly predominated. About 10 per cent. were bacillary and a few cross forms were found. Cross forms were found in smears from the spleen and plasma bodies were identified in smears from glands, but none were found in the blood.

At the time there were 20 other imported cattle or their progeny in the building, but none became infected. The previous case of tick infection in this dairy had occurred two months earlier. This animal recovered. A few parasites resembling *Theileria mutans* were found in the blood.

DE MELLO (Froilano), with REBELLO (F.), PAES (S.), & D'ALMEIDA (C.). **Première contribution à l'étude des piroplasmidés de la province d'Angola.** [First Contribution to the Study of Piroplasmidae in Angola.]—*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 4.) 1923. Aug. No. 4. pp. 517–525. With 1 plate in colour.

This publication is a classification of the Piroplasmidae.

DE MELLO (F.). **Deuxième contribution à l'étude des piroplasmidés de la province d'Angola.** [Second Contribution to the Study of the Piroplasmidae in Angola.]—*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 4.) 1923. Aug. No. 4. pp. 539–543. With 1 plate in colour.

A small piroplasm found in blood smears from four cattle is figured and described. Pear-shaped, bacilliform, dividing forms and cross-shaped parasites were encountered. There were also crescentic forms which the author considers to be gametes, anaplasma-like forms and parasites which he considers to be transitional between anaplasms and piroplasms. In a short note the occurrence of a parasite of the bigeminum type is recorded. It was found in the blood of an ox which had recovered from redwater.

DE MELLO (F.) & CABRAL (E.). **Troisième contribution à l'étude des piroplasmidés de la province d'Angola.** [Third Contribution to the Study of the Piroplasmidae in Angola.]—*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 4.) 1923. Aug. No. 4. pp. 547–549. With 1 plate in colour.

This short paper contains observations on the morphology of piroplasms found in sheep.

The observations were made on four blood smears, and the conclusion is arrived at that the parasite was *Gonderia mutans.*

The authors have found a similar parasite in very small numbers in the blood of 2 out of 12 apparently healthy sheep.

Ring-shaped, pear-shaped, dividing forms, anaplasma-like forms, transitional forms and gametes are described.

DE MELLO (F.), REBELLO (F.), PAES (S.), & D'ALMEIDA (C.). **Sur un piroplasmide parasite du** *Bos brachycerus* **d'Angola.** [A Piroplasma of *Bos brachycerus* in Angola.]—*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 4.) 1923. Aug. No. 4. pp. 527–529. With 1 plate in colour.

Pyriform, rounded, twin, cross forms, bacilliform, oval, crescentic shapes are figured and described. In smears from the muscles and liver large schizonts were found, but it was not possible to make out whether these forms were enclosed in blood corpuscles or not.

The parasite is provisionally named *Piroplasma* (*Achromaticus*) *brachyceri.*

DE MELLO (Froilano) & REBELLO (Frederico). **Anaplasmose du** *Bos brachycerus* **d'Angola.** [Anaplasmosis of *Bos brachycerus* in Angola.]—*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 4.) 1923. Aug. No. 4. pp. 531–532. With 1 plate in colour.

The blood contained a considerable number of parasites, as one or two invaded corpuscles were to be found in every field of the microscope. The parasites were centrally or peripherally placed in the cells and were surrounded by a pale halo. The blood showed no changes. Free forms were seen.

DE MELLO (F.) & PAES (S.). **Morphologie et cycle schizogonique d'un Piroplasmidé, parasite d'une chèvre de Calumbo.** [The Morphology and Schizogonic Cycle of a Piroplasm of a Goat at Calumbo.] —*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 4.) 1923. Aug. No. 4. pp. 533–536.

The authors examined the blood of the goat prior to death, and saw what they believed to be piroplasms. During the transport of the sick animal to Loanda it died, and the post-mortem examination revealed dilatation of the stomach, petechiae on the abdominal wall, intense congestion of the liver, enlargement of the spleen, pericarditis. Smears were made from the organs and from the blood. Parasites were found in the latter only.

There was evidence of marked anaemia, and more than 20 per cent. of the corpuscles contained parasites. These were markedly polymorphic.

The parasite was classified as *Gonderia ovis* (Babes) 1892 *emend.* Sergent.

STUART (G.), KRIKORIAN (K. S.), & GILBERT (S. J.). **Note on the Occurrence of Anaplasmosis in Palestine.**—*Jl. Comp. Path. & Therap.* 1924. Sept. 30. Vol. 37. No. 3. pp. 149–154. With 2 text-figs & 1 chart.

The authors place on record the occurrence of a case of anaplasmosis in Palestine, and also the experimental transmission of the disease to a calf.

For some time previously a disease resembling gall sickness had come under notice, but a definite diagnosis had not been established.

The disease was definitely diagnosed in a Beyrout cow imported into Palestine. The symptoms were fever, marked jaundice, loss of appetite, acceleration of pulse and respiration, but there was no haemoglobinuria.

The frequency of the parasite in the blood films is not mentioned, but it is stated that the blood corpuscles showed evidence of severe anaemia.

A native-born calf was purchased for experimental infection, and kept quite free of ticks. This animal was inoculated with 10 cc. of citrated blood from the cow. The calf's blood was carefully examined prior to inoculation, but no evidence of infection could be found. Anaplasma was first found in the blood 21 days after inoculation, and five days before there was any rise of temperature, and they were most numerous for a few days just before the temperature rose. They were scanty during the period of fever (a week). Mast cells were found in the blood for about a week before the parasite appeared.

The clinical symptoms were very inconspicuous.

VAN SACEGHEM (R.). **Les Theilérioses. Note préliminaire.** [The Theileriases. Preliminary Note.]—*Bull. Soc. Path. Exot.* 1924. Oct. Vol. 17. No. 8. pp. 637–639.

Van Saceghem states that the disease described by SERGENT as being caused by *Theileria dispar* n.sp. occurs in Ruanda (E. Africa) and Kivu (Belgian Congo). He states, however, that, contrary to what is held to be the case by SERGENT, he has encountered chronic forms of the disease. He believes that the disease described by SERGENT is identical with that described by BRUMPT as being caused by *Th. mutans*.

The whole question of East Coast fever requires revision, and the view is put forward that the diseases caused by *Th. dispar* and *Th. mutans* are merely forms of a single disease, East Coast fever.

PLANTUREUX (Edm.). **Au sujet de la "formol-gélification" chez les dromadaires et chez les bovidés.** [The "Formol-Gel" Test in Dromedaries and Cattle.]—*Arch. Inst. Pasteur d'Algérie.* 1924. June. Vol. 2. No. 2. pp. 163–165.

Technique.—Clear, unheated sera only have been used, and on the day following the withdrawal of blood.

Twenty drops of serum were placed in tubes, and to these were added 1, 2, and 4 drops of "formol."

The samples were taken from bulls imported from France for experimental work, and ranging in age from 8 to 20 months. Of 14 animals which were healthy two gave positive reactions. Of 11 infected with piroplasmosis and 2 infected with anaplasmosis, 8 gave positive reactions.

The test cannot be relied upon for the detection of piroplasmoses in cattle.

CLARK (H. C.) & ZETEK (J.). **Tick Biting Experiments in Bovine and Cervine Piroplasmosis.**—*Amer. Jl. Trop. Med.* 1925. Jan. Vol. 5. No. 1. pp. 17–26.

Margaropus annulatus australis and *Amblyomma cayenense* are found on cattle and deer in Panama. White-tailed deer (*Odocoileus chiriquensis*) have been found to harbour piroplasms, and the progeny

of ticks from one such infected deer caused a mild attack of piroplasmosis when placed on a half-bred calf. In an experiment of the reverse kind a mild attack of piroplasmosis was set up in a brocket deer (*Mazama sartorii reperticia*) by seed ticks of *Margaropus annulatus australis* from an ox.

The results appear to suggest that deer may act as reservoirs for cattle piroplasmosis.

BELITZER (A.). **Epizootie und Prophylaxis der Piroplasmose der Pferde, hervorgerufen von** *Babesia caballi*. [Epizootiology and Prophylaxis of Equine Piroplasmosis caused by *Babesia caballi*.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1925. Jan. 20. Vol. 94. No. 1. pp. 51–56.

Both types of equine piroplasmosis occur in Russia. That caused by *B. caballi* is found in Central and Southern Russia, while that due to *Nuttallia equi* is found in the south only. The former is transmitted by *Dermacentor reticulatus*, and the latter, in all probability, by *Hyalomma aegyptium*.

The disease has a seasonal and regional distribution. It occurs as an epizootic in May and June and isolated cases occur in September and October. The larvae and nymphs of *Dermacentor reticulatus* do not transmit the disease.

The adult ticks attach themselves during April and May. The larvae and nymphs appear to pass the summer months on small rodents. During the autumn the mature ticks appear, but these are not active, and only attach themselves to the large animals in very small numbers.

The disease is of great economic importance, as the animal loss is very heavy. On an average, 30 to 40 per cent. of affected animals die. Young animals do not suffer as severely as adults, but all are susceptible to infection.

Trypanblue does not effect a complete cure. In spite of the severity of the disease clinical recovery takes place very rapidly.

ROSENBUSCH (F.) & GONZÁLEZ (R.). **Garrapatizacion y Tristeza.** [Ticks and Tristeza.]—*Revista Med. Vet.* Dec. 1923 & Jan. 1924. Vol. 6. Nos. 15 & 16. pp. 683–703.

The common tick of the sheep (*Boophilus microplus*) transmits both piroplasmosis and anaplasmosis. The infectivity of the tick depends upon the external termperature.

In the spring ticks are not, as a rule, infective, but they become so when the temperature reaches 29° C.

Anaplasmosis is transmitted only when the temperature exceeds 34° C.

Since the temperature at Buenos Aires is moderate piroplasmosis alone is generally set up in experiments.

Immunity conferred by inoculation does not protect against infection carried by ticks, and that conferred by ticks is only effective in the same area. It does not confer protection against infection by ticks in other parts.

Anaplasmosis is not transmitted either by Haematopinus or by Amblyomma, nor by ingestion.

The infection is carried from generation to generation of the ticks in the case of both diseases.

LIGNIÈRES (J.). **Nouvelles preuves de l'inoculation de l'Anaplasma du boeuf au mouton, puis du mouton au mouton. Comparaison des résultats obtenus avec ceux publiés par l'Institut Pasteur d'Algérie.** [New Proofs of the Transmissibility of Anaplasma from the Ox to the Sheep and from Sheep to Sheep. Comparison of Results obtained with those of the Pasteur Institute, Algiers.]—*Bull. Soc. Path. Exot.* 1924. Oct. Vol. 17. No. 8. pp. 647–651.

Details are given of a number of inoculations of adult Lincoln sheep with anaplasma. Young animals are less susceptible. Inoculated sheep show no evidence of infection, and the parasite cannot be found in their blood, but its persistence can be proved even after a number of passages by the inoculation of bovines with the blood of the last sheep of a series. This has been proved up to 7 passages through sheep lasting 2 years altogether.

These results are very different from those obtained in Algeria, and the significance of the difference is not yet known. Cross immunity experiments are necessary.

LIGNIÈRES (J.). **Démonstration en France de la réceptivité des ovins à l'*Anaplasma argentinum*, par injection à des bovidés, du sang d'un mouton apporté de Buenos Ayres. Quelques réflexions sur les résultats obtenus.** [Demonstration in France of the Susceptibility of Sheep to *A. argentinum*, by the Injection of Cattle with the Blood of a Sheep imported from Buenos Ayres.]—*Bull. Soc. Path. Exot.* 1924. Oct. Vol. 17. No. 8. pp. 642–647.

In 1923 Lignières brought over to France two sheep which had been inoculated with anaplasma from a bovine. One was a first passage inoculation, and the other a fourth passage in sheep.

With blood from these animals bovines were inoculated successfully in France. It was noted that the Breton race of cattle used in these experiments presented a greater degree of resistance than shorthorns and Herefords in the Argentine. In using anaplasma which has been passed through sheep for the immunization of cattle, resistant breeds may be inoculated with the first or second sheep passage of the parasite, while susceptible animals should be inoculated with blood from sheep of the sixth or seventh passage.

LESTOQUARD (F.). **Deuxième note sur les Piroplasmoses du mouton en Algérie. L'anaplasmose : *Anaplasma ovis*. nov. sp.** [Second Note on Piroplasmosis in Sheep in Algeria. *Anaplasma ovis*. n.sp.]—*Bull. Soc. Path. Exot.* 1924. Nov. 12. Vol. 17. No. 9. pp. 784–788.

Infection of sheep with anaplasms exists in addition to infections with *Babesiella ovis*, *Gonderia ovis*, and *Theileria ovis* previously described.

The parasite may be marginal, sub-marginal or central in position and is responsible for a disease the essential character of which is an anaemia. The condition is transmissible by inoculation and the

period of incubation varies from 8 to 40 days, with an average of 25. Parasites may appear before or after the first rise of temperature, and the duration of fever is irregular. About 7 per cent. of the corpuscles may be invaded; and the parasites may be discovered in the blood after the temperature has fallen. The loss of corpuscles may be from 5 to 10 million per cmm. That is, a drop from 12 to 15 million to 5 to 6 million. *Anaplasma ovis* is transmissible to the goat.

Attempts to cultivate the parasite have failed; although multiplication of the parasite has been observed in the primary tubes, subcultivation has failed.

FRANCHINI (G.). **Observations sur les hématozoaires des oiseaux d'Italie (2e note).** [The Haematozoa of Birds in Italy.]—*Ann. Inst. Pasteur.* 1924. June. Vol. 38. No. 6. pp. 470–515.

The author has examined 186 birds representing 23 species. The following parasites have been detected: *Halteridium danilewskyi* on 57 occasions; *Haemamoeba relicta*, 9; *Leucocytozoon danilewskyi*, 21; Haemogregarina, 1; Toxoplasma, 2; Trypanosoma, 5; Spirochaeta, 1; and Microfilaria, 5.

Brief descriptions and text figures are given of these.

SMITH (Theobald) & FLORENCE (Laura). *Encephalitozoon cuniculi* **as a Kidney Parasite in the Rabbit.**—*Jl. Experim. Med.* 1925. Jan. 1. Vol. 41. No. 1. pp. 25–35. With 3 plates.

This parasite has been under observation in the author's laboratory since it was first seen in 1918. References are given to the descriptions of it that have appeared in print since the first published account by WRIGHT and CRAIGHEAD in 1922.

Since October, 1922, the authors have found 45 cases of infection out of 163 autopsies made.

Observations indicate that all individuals in a litter are not invaded sufficiently heavily to cause symptoms. The parasite has been found in young rabbits only (under six weeks).

The most frequent seat is in the epithelium of the collecting tubes near the tip of the papilla. It is sometimes seen in the loop of Henle, and but rarely in the convoluted tubes and Bowman's capsule. The invaded cells may contain large numbers of individual parasites. When large numbers are present the invaded cells swell up and finally burst. The individuals are 2·5 to 3μ in length and 1·5 to 2μ broad, and they have rounded ends. Certain appearances suggest that they are protozoal in origin. There are, for example, sometimes present forms which have the appearance of being pan-sporoblasts.

It is suggested that the parasite is a kidney parasite somewhat resembling Klossiella, and that several asexual generations are passed in that organ.

Whether the organism is a true parasite of the rabbit or an aberrant form from an insect host is a point still unsettled. The development of the parasite in tissues other than the kidney and in animals other than the rabbit suggest the latter, but the wide geographical distribution of the parasite in rabbits suggests the former.

LUKES (Jean). **Sur la présence de spirochètes chez les chiens atteints de gastro-entérite et sur le rôle pathogène possible de ces micro-organismes.** [The Presence of Spirochaetes in Dogs suffering from Gastro-Enteritis, and the Possible Pathogenic Rôle of these Parasites.]—*Ann. Inst. Pasteur.* 1924. June. Vol. 38. No. 6. pp. 523–528.

In 1922 the dogs in Brno suffered from a haemorrhagic gastro-enteritis accompanied by ulcerative stomatitis.

Silver impregnation methods were applied to the organs of a number of the cases and 17 out of 22 showed spirochaetes. In all cases the parasite was present in the kidneys, in 7 they were found in the liver, in 6 in the spleen, in 6 in the walls of the large vessels, and in 3 in the pancreas. The organs of three control dogs dead of other diseases showed none.

During 1923, 8 further cases came under observation, and the kidneys of 7 of these contained spirochaetes.

The parasite was readily transmitted to the guineapig. Thirteen were inoculated and 8 died. There is no rise of temperature at the beginning of the infection, but after a period of incubation of about a week the animals become dull and begin to waste. There is marked thirst and polyuria.

A few experiments have been carried out with dogs (4). One positive result was obtained by feeding with urine after neutralization of the gastric juice. Death took place on the 14th day from stomatitis and haemorrhagic gastro-enteritis.

The parasite is best seen in sections treated by Levaditi's method. They measure 5–20μ in length, but some appear to be much longer and to be formed of two individuals jointed together by a slender thread. These appear to be dividing. The bodies have knob-like formation or rings at their ends. In the living state the spirochaetes do not show much movement of translation.

Attempts at culture have not been very successful, but the best results have been obtained by dropping fragments of the tissue containing the parasite into broth, and incubating the tubes for about 10 days at 37° C. The cultures have been contaminated as a rule. Subcultures have been made in broth or in diluted serum with the addition of renal extract. No paraffin has been used.

The lesions found are as follows: In one-third of the animals buccal lesions have been found, erosions and ulcerations. These may heal before death occurs.

The alimentary canal contains a blood-stained liquid, and the walls show haemorrhages and possibly ulcerations.

The liver is enlarged and hyperaemic, but there is seldom any jaundice. The pancreas is oedematous, and sometimes shows necrotic centres.

The kidneys are enlarged and congested. Microscopic examination shows that the epithelium of the convoluted tubes is disintegrated, the débris obstructing the lumen. In other cases the picture is one of acute interstitial nephritis.

Finally, in chronic cases, there are found urinary casts, proliferation of the cells, fibrinous exudate and proliferation and desquamation of the cells of Bowman's capsule.

The lungs may be healthy, but there may be congestion and oedema. The pleura, on the other hand, is the seat of lesions which appear to be specific; there are haemorrhages about the size of beans.

The aorta may show endarteritis, and on microscopic examination mononuclear infiltrations may be found.

The spleen pulp is congested and shows haemorrhages.

GERLACH (F.). **Geflügelspirochätose in Oesterreich.** [Avian Spirochaetosis in Austria.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1925. Jan. 20. Vol. 94. No. 1. pp. 45–51.

Spirochaetosis is more common in birds in Austria than has been supposed. Observations made during the last year indicate that it is very widespread. Possibly it has become more common since the war, but it is not unlikely that it was overlooked formerly.

The lesions are enlargement of the spleen and kidneys, yellowish or greyish centres in the liver, catarrh of the intestine, and occasionally pneumonia and serofibrinous peritonitis.

Argas ticks were never found, but *Dermanysus* was present in large numbers.

No success followed attempts to cultivate the parasite.

Natural recovery frequently occurred, and recovered birds appeared to possess a high degree of immunity.

BÉDIER (E.). **Piroplasme de la mangouste d'Afrique** *Herpestes calera* **Erxleben.** [Piroplasma of the African Ichneumon.]—*C.R. Soc. Biol.* 1924. Feb. 22. Vol. 90. No. 6. pp. 415–417.

BLANCHARD (M.) & LAIGRET (J.). **Résultats éloignés du traitement de la maladie du sommeil par les fortes doses d'atoxyl. Traitement curatif et atoxylisation prophylactique.** [Treatment of Sleeping Sickness with Atoxyl, both Curatively and Prophylactically.]—*Ann. Inst. Pasteur.* 1924. June. Vol. 38. No. 6. pp. 460–469.

FRANCHINI (G.). **Ricerche sui protozoi e sulle microfilarie nei cani in provincia di Bologna e di Ferrara.** [Canine Protozoa and Microfilariae in Bologna and Ferrara.]—*Pathologica.* 1925. Jan. 1. Vol. 17. No. 387. pp. 19–21.

VAN SACEGHEM (R.). **Le pouvoir empechant dans les trypanosomiases.** [Inhibition in Trypanosomiasis.]—*Bull. Agric. Congo Belge.* 1923. Dec. Vol. 14. No. 4. pp. 610–612.

This note has appeared elsewhere and has already been abstracted. See this *Bulletin.* 1924. Vol. 12. p. 42.

SULDEY (E. W.). **Dysenterie amibienne spontanée chez le chimpanzé** (*Troglodytes niger*). [Spontaneous Amoebic Dysentery in the Chimpanzee.]—*Bull. Soc. Path. Exot.* 1924. Nov. 12. Vol. 17. No. 9. pp. 771–773.

DISEASES DUE TO METAZOAN PARASITES.

SCHWARTZ (B.). **Preparasitic Stages in the Life History of the Cattle Hookworm** (*Bustomum phlebotomum*).—*Jl. Agric. Research.* 1924. Nov. Vol. 29. No. 9. pp. 451–458.

At a temperature of 70°–80° F. the eggs of the parasite require about four days for hatching. Two periods of lethargus, each lasting about 24 hours, are separated from each other by two periods of vitality, each also lasting 24 hours.

In liquid cultures both cuticles are usually retained by the larvae, but in solid cultures the first cuticle is cast off.

The infective larvae are only moderately active at room temperatures, and they appear to be more resistant than the pre-infective larvae. They are positively thermotropic, turning the cephalic extremity towards a source of heat. In a solution of 1 per cent. basic fuchsin the infective larvae remain alive and apparently unaffected by it. After several hours' exposure the stain does not penetrate beyond the sheath. While desiccation is fatal, vitality is maintained where there is a small amount of moisture.

The larvae collect in the part of the culture medium where the light is strongest. They climb up the walls of containing vessels, but it is not certain whether this is the result of negative geotropism or the effect of light.

The larvae have not been found to show any tendency to penetrate skin.

SMILLIE (W. G.) & PESSOA (S. B.). **Treatment of Hookworm Disease with a Mixture of Carbon Tetrachloride and Ascaridol.**—*Amer. Jl. Trop. Med.* 1925. Jan. Vol. 5. No. 1. pp. 71–80.

The ideal treatment for hookworm infestations should possess the following characteristics :—

A single treatment should be efficient. It should remove other common intestinal parasites. It must be non-toxic, easy to administer, and inexpensive.

Carbon tetrachloride may be inefficient in small doses, 1 to 1·5 cc., and toxic in doses of 3–4 cc.

Ascaridol is next in efficiency.

Ascarides and male hookworms are especially susceptible to ascaridol, while the females resist this but are removed by carbon tetrachloride. A mixture of reduced doses may therefore be given without decreasing toxicity, but the mixture must not be allowed to stand for long because the carbon tetrachloride is volatile. If ascaridol, the active principle of chenopodium, is not available, carbon tetrachloride may be mixed with the oil of chenopodium in the proportion of 2 and 1.

WARE (F.). **A Case of Habronemiasis in England.**—*Jl. Comp. Path. & Therap.* 1924. Sept. Vol. 37. No. 3. pp. 160–162.

The animal, a thoroughbred, had never been out of England.

The history of the case was that the animal had been noticed to lose condition very suddenly about three weeks previously. It chewed small amounts of food, but did not swallow it, the faeces were normal in appearance, but only small amounts were passed. The urine was usually cloudy. The temperature was subnormal and the pulse slow. At times patchy sweating was observed.

The spleen, which was very dark in colour and resilient to the touch, weighed 18 lb. The whole of the other abdominal viscera appeared to be extraordinarily small. The mucous membrane of the last six feet of the small intestine was very oedematous, and the muscular coats were thickened. The sacculations of the first portion of the double colon contained small collections of dried ingesta which appeared to have had all moisture pressed out of them, and had thus been moulded into irregular shapes by the bowel.

The heart was flaccid. The other organs appeared to be normal.

On opening the stomach it was found to contain about a pint of yellow liquid and a pultaceous mass of green foodstuff. The mucous membrane was covered with a greenish yellow fibrinous exudate, and showed about a score of gastrophilus larvae. In the liquid there were found large numbers of *Habronema microstoma*.

It is of interest that this species, the occurrence of which in England is here recorded for the second time, requires *Stomoxys calcitrans* for the completion of its life cycle, whereas *H. megastoma* and *H. muscae* are transmitted by the common house fly, and one would therefore have thought that these species would perhaps have been met with not infrequently.

BOULENGER (C. L.). **The Filariid of the Camel,** *Acanthocheilonema evansi* **(Lewis).**—*Parasitology*. 1924. Dec. Vol. 16. No. 4. pp. 419–423. With 4 text-figs.

The author supplements and corrects the account of this parasite given by BAYLIS and DAUBNEY.

GAYCHET (M. P.). **Ophtalmie vermineuse du boeuf.** [Verminous Ophthalmia in the Ox.]—*Rev. Vétérinaire*. 1924. Oct. Vol. 76. No. 10. pp. 598–600.

The author records the occurrence of a worm 2 centimetres long in the anterior chamber of the eye of a cow. After some delay the owner agreed to surgical interference and the aqueous humour was released by a transverse incision across the lower margin of the cornea. No information is given as to whether the worm was found in the liquid when it was released and whether it was examined.

BAYLIS (H. A.). **The Range of Variation of** *Hymenolepis nana* **in Rats and Mice.**—*Parasitology*. 1924. Dec. Vol. 16. No. 4. pp. 415–418.

The author gives reasons for believing that his species *H. longior* is not distinct, but a synonym of *H. nana*.

VAN SACEGHEM (R.). **Remarque sur la dispersion geographique de l'***Ornithodorus moubata*. [The Geographical Distribution of *Ornithodorus moubata*.]—*Bull. Agric. Congo Belge*. 1923. Dec. Vol. 14. No. 4. pp. 612–613.

O. moubata is not found in the jungles of the Lower Congo (RODHAIN). Van Saceghem finds that it is absent in the volcanic areas of Ruanda and Kivu.

Kissenyi, on the northern shore of Lake Kivu, is of volcanic origin, and although numerous caravans pass through, and must bring the tick with them, the place does not become infested. It is suggested that the chemical changes which occur in the volcanic soil make it unfavourable for the parasite.

Ross (I. C.). **The Bionomics of** *Ixodes holocyclus* **Neumann, with a Redescription of the Adult and Nymphal Stages and a Description of the Larvae.**—*Parasitology.* 1924. Dec. Vol. 16. No. 4. pp. 365–381. With 1 plate and 2 text-figs.

The work was carried out as a preliminary to research regarding the nature of the causative agent of tick paralysis. The tick is of economic importance along almost the whole coastal region of Eastern Australia as a cause of fatal paralysis in cats and dogs. Foals, calves and lambs are also said to be affected and authenticated cases of the disease in children are on record.

MacGregor (M. E.). **Tests with** *Chara foetida* **and** *C. hispida* **on the Development of Mosquito Larvae.**—*Parasitology.* 1924. Dec. Vol. 16. No. 4. pp. 382–387.

Experiments indicated that extracts of the plants had no useful application as anti-mosquito substances.

Chandler (A. C.). **New Filariae from Indian Birds.**—*Parasitology.* 1924. Dec. Vol. 16. No. 4. pp. 398–404. With 10 text-figs.

van Cleave (H. J.). **Additional Notes on the Acanthocephala from America described by J. E. Kaiser [1893].**—*Centralbl. f. Bakt.* 1. Abt. Orig. 1925. Jan. 20. Vol. 94. No. 1. pp. 57–60. With 5 text-figs.

Cram (E. B.). **A New Nematode,** *Cylindropharynx ornata,* **from the Zebra, with Keys to Related Nematode Parasites of the Equidae.**—*Jl. Agric. Res.* 1924. May 17. Vol. 28. No. 7. pp. 661–672. With 8 text figs.

Dive (G. H.) & Lafrenais (H. M.). **A Case of Deposition of the Eggs of** *Hepaticola hepatica* **in the Human Liver.**—*Jl. Royal Army Med. Corps.* 1924. July. Vol. 43. No. 1. pp. 1–4. With 2 plates.

Hall (M. C.) & Shillinger (J. E.). **Critical Tests of Miscellaneous Anthelmintics.**—*Jl. Agric. Res.* 1924. Oct. 1. Vol. 29. No. 7. pp. 313–332.

Korke (V. T.). **On a New Microfilaria from the Dog.** *Microfilaria lewisii* **(N.S.).**—*Indian Jl. Med. Res.* 1924. Apr. Vol. 11. No. 4. pp. 1231–1237. With 1 plate.

——. **Revision of the Type Species of Rudolphi in India.**—*Indian Jl. Med. Res.* 1924. Apr. Vol. 11. No. 4. pp. 1239–1243. With 2 text-figs.

Lagrange (M. E.). **Sur un Trichocéphalidé du rat, à Shangai,** *Hepaticola hepatica,* **Hall 1916.** [A Trichocephalide of the Rat. *Hepaticola hepatica.*]—*Bull. Soc. Path. Exot.* 1924. Oct. Vol. 17. No. 8. pp. 658–659.

MacGregor (M. E.). **Special Apparatus and Technique for the Study of Mosquitoes and other Aquatic Insects.**—*Parasitology.* 1924. Dec. Vol. 16. No. 4. pp. 388–397. With 7 text-figs.

Senevet (G.). **Description de la Nymphe de** *Hyalomma mauritanicum* **Senevet 1922.** [Description of the Nymph of *Hyalomma mauritanicum* Senevet 1922.]—*Arch. Inst. Pasteur d'Algérie.* 1924. June. Vol. 2. No. 2. pp. 233–234. With 4 text-figs.

—— & Rossi (P.). **Contribution à l'étude des Ixodidés (XII^e Note). Etude saisonnière des Ixodidés de la région de Bouira (Algérie).** [A Seasonal Study of the Ixodidae in the Bouira Area in Algeria.]—*Arch. Inst. Pasteur d'Algérie.* 1924. June. Vol. 2. No. 2. pp. 223–232.

STUNKARD (H. W.). **A New Trematode,** *Oculotrema hippopotami,* **n.g., n.sp., from the Eye of the Hippopotamus.**—*Parasitology.* 1924. Dec. Vol. 16. No. 4. pp. 436–440. With 1 plate.

WOODLAND (W. N. F.). **On the Development of the Human** *Hymenolepis nana* **(Siebold 1852) in the White Mouse; with Remarks on** *"H. fraterna," "H. longior,"* **and** *H. diminuta.*—*Parasitology.* 1924. Dec. Vol. 16. No. 4. pp. 424–435.

BACTERIAL DISEASES.

SANARELLI (G.). **Charbon "interne" chez les animaux rendus "porteurs" de spores charbonneuses.** ["Internal" Anthrax in Animals that are Carriers of Anthrax Spores.]—*C. R. Acad. Sci.* 1924. Nov. 17. Vol. 179. No. 20. pp. 1100–1103.

It is known that guineapigs and rabbits can be fed with material containing anthrax spores without showing any evidence of infection, although cultures can be obtained from the organs of those animals after a lapse of some hours.

The effect of spores introduced into the lungs appears to be uncertain, partly because of the difficulty of assuring entire absence of wound infection. Sanarelli states that it is possible to introduce a suspension of anthrax spores into the lungs of a rabbit by using a syringe which is covered with rubber at the nozzle. This is inserted into one nostril, while the other is closed with the finger. The liquid in the syringe can be injected through the nasal fossa direct to the lungs. A dose of 50,000 spores suspended in 2 cc. of liquid injected in this way does not cause anthrax, but twice this dose does because the defensive cells of the body are not able to deal with so large a number. 150,000 spores may be placed in the nasal fossa without causing infection, but infection results if the same dose is injected into the lungs. The phagocytized spores behave like washed tetanus spores and in the course of time are digested. If a substance which produces cytolysis, such as arsenic, quinine, lactic acid, etc., be injected into one of the organs or even under the skin, before digestion has occurred, anthrax spores germinate and infection results.

MONOD (T.) & VELU (H.). **L'intradermovaccination en un temps contre le charbon bactéridien et ses avantages.** [The Advantages of the Single Intradermo-Vaccination against Anthrax.]—*C. R. Soc. Biol.* 1925. Feb. 5. Vol. 92. No. 4. pp. 251–253.

During the year 1924 the following numbers of animals were vaccinated by the intradermal method: Cattle, 14,405; Sheep, 2,520; pigs, 4,640; and horses, 75. The veterinary officers carrying out the inoculations were requested to forward comments on the method. The process was not followed by any reaction, but in one herd piroplasmosis (not verified) made its appearance. Accidents of this kind have been observed before.

The conclusions drawn from the reports received were as follows:—

The single intradermo-vaccination confers a solid immunity, and protected cattle resist infection in heavily contaminated areas.

The vaccination can be carried out even during an outbreak without recourse to previous serum protection, in spite of the fact that there is a slight increase in susceptibility from the 24th to the 48th hour.

The method appears to be at least as effective as the subcutaneous inoculation, and resistance is promptly established.

VELU (H.). **Essai concluant d'intradermovaccination contre le charbon bactéridien en milieu profondément infecté.** [Intradermo-Vaccination against Anthrax on Heavily Contaminated Premises.]—*Bull. Soc. Path. Exot.* 1924. Nov. Vol. 17. No. 9. pp. 767–770.

This paper contains the records of intradermo-vaccinations against anthrax carried out on premises where the disease regularly appeared four to five months or more after vaccination had been carried out in the ordinary way. Such failures to protect have been recorded in other countries, and they can be guarded against to some extent by the employment of a third vaccine which is only slightly attenuated. This, however, is not practicable in Morocco.

The intradermo-vaccinations were carried out with attenuated strains of the anthrax supplied by THEILER.

The results of experiments carried out on a considerable number of animals with a sufficient number of controls showed that the efficacy of the Pasteur vaccines is the same in Morocco as in France.

The vaccine prepared at Casablanca is at least as active as the Pasteur vaccines.

Intradermo-vaccination can be carried out, in colonial centres, even when an outbreak is actually in existence.

DESCAZEAUX (J.). **Essais de cutivaccination anticharbonneuse.** [Anti-Anthrax Cuti-Vaccination.]—*Bull. Soc. Path. Exot.* 1924. Nov. Vol. 17. No. 9. pp. 765–767.

Experiments in vaccination by scarification have been carried out on a horse, an ox, and five sheep. The vaccine was prepared from a culture which is described as being slightly less active for laboratory animals than the No. 3 vaccine of the Pasteur Institute.

Two types of vaccine have been used. In one " diadermine " was the excipient and in the other lanoline.

A horse, an ox, and one sheep were treated with the " diadermine " vaccine which was applied to scarifications of the skin. The large animals had about ½ cc. applied, and the sheep ¼ cc. Two sheep were treated with lanoline vaccine. One sheep had rubbed into a scarified area a triple dose of liquid vaccine. One sheep was kept as a control.

Six weeks later the ox and the horse were inoculated subcutaneously with ½ cc. of virulent culture, and the 5 sheep received ¼ cc. of the same material. The control sheep died within 48 hours.

Two vaccinated sheep died the following day and on the following day the other inoculated animals presented alarming symptoms. Anti-anthrax serum was used with beneficial results.

STRÖSZNER (E.). **Ueber Milzbrandimmunität und Milzbrandschutzimpfung.** [Immunity and Protective Inoculation against Anthrax.]—*Seuchenbekämpfung.* Vienna. 1925. Vol. 2. No. 1/2. pp. 79–90.

This paper is a review of the present state of knowledge regarding immunity to and protective inoculation against anthrax.

SANFELICE (Francesco). **Intorno alle mutazioni del bacillo del carbonchio.**—*Bol. d. Instituto Sieroterap. Milanese.* 1924. Nov. Vol. 3. No. 6. pp. 341–352. With 1 plate. [6 refs.]

This article is divided into six sections. In the first the author describes previous work on the anthrax bacillus showing that by subcutaneous injection of cultures into dogs, or by the use of collodion sacs in their peritoneal cavity, a non-sporing, non-pathogenic coccobacillus is produced. In the white rat a Gram-negative, coliform organism results, denominated by ZIRONI *Bacterium anthracis colisimile,* which is capable of immunizing small laboratory animals against virulent anthrax. Part II gives an account of the conditions under which the anthrax bacillus becomes transformed *in vitro* into the coccobacillary form, the chief of which are the absence of spores and of oxygen. The latter is amplified in a later section, where it is stated that growth in depth of agar or under oil after 10 days at 22°–24° C. is completely transformed from *Bacillus anthracis* to *Bacterium anthracis colisimile.* He next discusses the morphological and cultural characters of this organism and its pathogenicity. It must, he says, be regarded as a new species and not a mere mutation, because there is practically nothing in common between it and the original anthrax bacillus. The organism is Gram-negative, does not liquefy gelatin, does not spore, occurs singly or in twos, not in chains, is not agglutinated by anti-anthrax serum, and does not cause death even when inoculated in considerable quantities beneath the skin of a guineapig or rabbit. Intravenously, it kills in 24 hours with swelling of the spleen and liver. The author did not confirm the immunizing power of this against the true *B. anthracis.**

ZIRONI (A.). **Osservazioni sul lavoro del prof. F. Sanfelice "Intorno alle mutazioni del bacillo del carbonchia."**—*Bol. d. Instituto Sieroterap. Milanese.* 1924. Nov. Vol. 3. No. 6. pp. 352–354.

This is a brief reply to the paper of SANFELICE in which it is stated that the latter was unable to confirm Zironi's results that the *B. anthracis colisimile* would immunize laboratory animals against virulent anthrax. Dr. Zironi modifies the statement by saying that three rats previously inoculated with pus from another rat which, as a result of injection of anthrax bacilli, had developed the *colisimile* variety, survived injection of virulent anthrax organisms while control animals succumbed, but that rats, guineapigs and a dog inoculated with *Bacterium anthracis colisimile* in large or small amounts did not thereby acquire any immunity to virulent anthrax.*

* Summarized by Dr. H. Harold Scott.

BROCQ-ROUSSEU, TRUCHE & URBAIN (A.). **Vaccination contre la typhose aviaire par la voie digestive.** [Vaccination against *B. gallinarum* by the Alimentary Tract.]—*C.R. Soc. Biol.* 1924. Dec. 5. Vol. 91. No. 34. pp. 1185–1187.

Experiments have been carried out with emulsions of the organism killed by means of alcohol-ether mixture. The emulsion was made so that 1 cc. represented 1 mg. of dried bacilli. In the first experiment six fowls were given on successive days increasing doses of emulsion by the mouth. They were then given living cultures after an interval by inoculation intravenously. Three survived. From two of the three which died the organism was recovered. In a second experiment two birds were used and these were given bile (ox) and were then tested by feeding (?) with culture.

The context appears to indicate that these two birds were two survivors from the previous experiment, but the use of different numbers would appear to imply that they were not.

SMITH (Theobald) & ORCUTT (Marion L.). **The Bacteriology of the Intestinal Tract of Young Calves with Special Reference to the Early Diarrhoea ("Scours").**—*Jl. Experim. Med.* 1925. Jan. 1. Vol. 41. No. 1. pp. 89–106. With 1 plate.

The following is an abstract of the authors' conclusions :—

New-born calves which receive no colostrum or receive it only after some delay may die of a septicaemia due to *Bacillus coli*; the diarrhoea being a local manifestation of this.

If the amount of colostrum is not sufficiently protective the calves may become affected with arthritis, nephritis, omphalitis, and possibly pneumonia.

There is a balance between certain strains of *Bacillus coli*, the mucous membrane and the digestive ferments which, if upset in favour of *B. coli*, causes diarrhoea.

There is a great increase in the number of *B. coli* in the terminal portion of the small intestine, and this spreads forwards. General intoxication results. The bacilli form layers attached to the top plates of the epithelial cells.

VIOLLE (H.). **Essais de vaccination cutanée contre** *B. abortus* **de Bang.** [Cutaneous Vaccination against the Abortion Bacillus (Bang).]—*C. R. Soc. Biol.* 1925. Feb. 20. Vol. 92. No. 6. pp. 421–422.

The experiments have been carried out with an American strain of *B. abortus*, and 3-day cultures on ordinary agar slopes have been employed. For the purpose of applying the dead cultures to the skin of the guineapigs an ointment was prepared with "axonge." Two guineapigs were carefully shaved on the abdomen so as to avoid any scarification. The ointment was then applied with friction over the shaved areas. Both guineapigs lost greatly in weight and died in about a month. Bacteria could be detected by the microscope in all the organs, and pure cultures of the bacillus were obtained on agar. The bacillus was agglutinated by specific serum obtained from BURNET (Tunis).

A second pair of guineapigs was inoculated in a similar manner, but before the live culture ointment was used they were treated three times at intervals of four days with ointment which had been sterilized by heating to 60° C. for one hour.

In this case there was no loss of weight save a very small one after three months. The animals were killed and both cultural and microscopic examination yielded negative results. It does not appear that there were any controls to show that the vaccine used was actually infective.

GAIGER (S. H.). **Anaerobic Infections in Animals.**—*Jl. Comp. Path. & Therap.* 1924. Sept. Vol. 37. No. 3. pp. 163–192.

MANNINGER (R.). **Beitrag zur Aetiologie und Prophylaxe des Rauschbrandes und des malignen Oedems der Wiederkäuer.** [The Etiology and Prophylaxis of Blackleg and Malignant Oedema in Ruminants.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1924. Aug. 22. Vol. 92. No. 5/6. pp. 418–424.

DISEASES DUE TO FILTERABLE VIRUSES.

ANDRIANI (S.). **Méthode simple et rapide pour mettre en évidence les corps de Negri dans la rage.** [A Simple and Rapid Technique for the Demonstration of Negri Bodies.]—*Ann. Inst. Pasteur.* 1924. June. Vol. 38. No. 6. pp. 520–522. With 1 text fig.

Thin slices (3 mm.) of Ammon's horn are fixed in acetone for one to two hours. These are embedded in paraffin by passing them through xylol, ½ hour, xylol-paraffin, ½ hour, and paraffin, 1 hour. Sections 5μ thick are fixed on slides or cover slips, and after the paraffin has been removed these are placed in the following solution for 5–10 minutes :—

Malachite green	20 centigrammes.
Orange G.	2 grammes.
90 per cent. alcohol	10 cc.
Distilled water	105 cc.

Without washing the slides are placed in the following solution :—

Chromic acid	50 centigrammes.
Potash alum	1 centigramme.
Distilled water	100 cc.

They remain in this for 2-3 minutes. After a brief wash they are placed in absolute alcohol, where the excess of green colour is removed and the sections acquire a pink tint. They are then passed through xylol and mounted in balsam.

The Negri bodies appear green. The cytoplasm and nuclei of the nerve cells are orange tinted and the neuroglia of a paler colour.

The specimens prepared in this way last for a considerable time.

KRAUS (R.). **Vorschläge zur Schutzimpfung gegen Hundswut.** [The Immunization of Dogs against Rabies.]—*Seuchenbekämpfung.* Vienna. 1925. Vol. 2. No. 1/2. pp. 71–74.

This short paper is divided into 2 parts.

The first part deals with the preservation of virulence of rabic material when it is placed in glycerin after a preliminary drying. This method results in an important economy being effected in materials.

The second part refers to the work which has been done in Japan in connexion with the immunization of dogs against rabies. The great increase in the number of dogs in Vienna during recent years has largely increased the danger of rabies. Muzzling has reduced the possibility of human beings being bitten, but by this means the disease cannot be stamped out.

LEVADITI (C.), NICOLAU (S.) & SCHOEN (R.). **La nature microsporidienne du virus rabique.** [The Microsporidian Nature of the Virus of Rabies.]—*C.R. Soc. Biol.* 1924. Feb. 22. Vol. 90. No. 6. pp. 398–402.

Examinations have been made of animals inoculated with fixed virus and street virus (Remlinger strain), and in no case have bodies resembling Negri bodies been found in those inoculated with fixed virus. A careful comparative examination has been made of the nervous system of a *Macacus cynomolgus* and material containing *Encephalitozoon cuniculi*.

The staining reactions, as shown by a number of different methods, of the two are very similar.

Treatment of specimens with hydrochloric acid prior to staining renders the membrane surrounding the parasite permeable to stains.

Negri bodies are found only in nerve cells the structure of which is not altered, and it appears to be probable that intact cells are necessary for their formation.

The authors believe that the microbe of rabies, which is filterable and ultravisible, gains access to the nerve cells and there undergoes a process of development which results in the formation of pansporoblasts or cysts which are the Negri bodies. The development of *Encephalitozoon cuniculi* is parallel. This organism is unable to develop save in intact and unaltered cells. When death of the cell results development of the parasite ceases, and phagocytosis occurs.

DE KOCK (G.). **Beiträge zur Kenntnis des Erregers, zur Hämatologie, pathologischen Anatomie und Histologie der infektiösen Anämie der Pferde, wie sie in Südafrika beobachtet wird.** [The Cause, Haematology, Pathological Anatomy and Histology of Infectious Equine Anaemia as observed in South Africa.]—*Folia Haematologica.* 1924. Dec. Vol. 31. No. 1. pp. 13–34.

This subject has been dealt with by de Kock in the 9th and 10th Reports of the Director of Veterinary Research, S. Africa. (See this *Bulletin.* 1924. Nov. 30. Vol. 12. No. 4. p. 136.)

LEBAILLY (M. C.). **Les mouches ne jouent pas de rôle dans la dissémination de la fièvre aphteuse.** [Flies play no Part in the Transmission of Foot and Mouth Disease.]—*C. R. Acad. Sci.* 1924. Nov. 24. Vol. 179. No. 21. pp. 1225–1227.

The author has carried out experiments which lead him to conclude that, in spite of popular opinion to the contrary, flies do not play any part in the dissemination of foot and mouth disease.

PANISSET (L.) & VERGE (J.). **Etudes sur la diphtérie aviaire. La réaction de Schick chez la poule.** [The Schick Test in Fowl Diphtheria.]—*C. R. Soc. Biol.* 1925. Jan. 16. Vol. 92. No. 1. pp. 7–8.

Fowl diphtheria is a contagious disease of birds due to a filterable virus, although the condition is held by some authors to be identical with human diphtheria.

The Schick test was carried out with diphtheria toxin obtained from the Pasteur Institute and diluted 1 in 1,000. By carrying out tests on a small number of healthy birds the authors obtained evidence that there is no connexion between human and avian diphtheria.

SCOTT (J. W.). **The Experimental Transmission of Swamp Fever or Infectious Anaemia by Means of Secretions.**—*Univ. of Wyoming Agric. Exp. Station Bull. 138.* 1924. June. 62 pp.

This bulletin contains descriptions of experiments designed to provide an answer to the question whether infectious anaemia may be transmitted through the medium of secretions.

In the first experiment a horse, which was admittedly a poor subject for experimental inoculation, was given a number of subcutaneous inoculations with washings of the nasal chamber of a chronic case. The result was inconclusive. Some of the serum of this animal was used for the inoculation of another horse. Again the result did not permit of the expression of a definite opinion as to the success of the experiment.

Another horse was used in this experiment also, but in this case the nasal washings were sprayed into the nose. Infection followed, and blood of this animal was used for the inoculation of another. The resulting reaction again indicated a positive result.

Two horses were injected subcutaneously with filtered nasal washings.

There appears to be some confusion of dates in the record of one of these animals and it is therefore a little difficult to follow the course of events. In neither case was infection clearly established.

An attempt to transmit the disease by direct transference of secretion from the eye of one horse to the eye of another failed.

Similarly, an attempt to infect with an extract of Tabanid flies yielded no result.

"The tabanids used in those experiments were collected in the midst of a large alfalfa field at a distance of one-half mile or more from any pasture which contained horses. By taking this precaution we were satisfied that the tabanids had had no chance of becoming infected or contaminated with the virus of swamp fever before they were used in our experiments."

A control was carried out by injecting an extract of the flies. No infection resulted. Infection with pernicious anaemia during pregnancy may lead to abortion, but there is no satisfactory evidence as to whether an infected mare transmits the infection to a foal born at full term.

MISCELLANEOUS.

TRUCHE (C.). **Moyen simple et pratique de conservation des germes.** [A Simple and Practical Method of maintaining Bacteria.]—*Ann. Inst. Pasteur.* 1924. June. Vol. 38. No. 6. pp. 516–519.

Bacteriologists are familiar with the difficulties of maintaining strains of organisms outside the body.

Frequent transplantations are often necessary to keep the cultures alive, and very often their virulence is profoundly modified. Animal passage, which can be utilized in some cases, may also lead to modifications of this character.

In 1918 UNGERMANN published an account of his method of using rabbit serum, diluted or not, and heated to 60° C. for half-an-hour for the preservation of bacteria, the serum being covered with a layer of sterile paraffin.

Truche has devised a modification of the method described by LEGROUX (1920) in which formolized serum is used. The organism which it is desired to preserve is sown out on an agar or serum agar slant, and incubated for 48 hours. With a sterile pipette 2 cc. of formolized serum is then spread over the culture, which is detached into the liquid by careful manipulation of the pipette. The liquid is then withdrawn by means of the pipette and placed in a small sterile tube. The author has kept a strain of Strangle's streptococcus for three years in this way, transplants being made only once a year. Other bacteria have been kept for many months, among which is the bacillus of fowl cholera.

It is advised that when it is necessary to utilize cultures frequently one tube should be kept unopened until transplantation is required, a number of parallel tubes serving current purposes.

TWORT (F. W.). **Further Modifications in the Preparation of Neutral Red-Light Green Double Stain, and an Improved Method of Embedding Tissues in Paraffin.**—*British Jl. Experim. Path.* 1924. Dec. Vol. 5. No. 6. pp. 350–351.

The author recommends the use of normal propyl alcohol as the solvent for the solid dye. One gram is ground up in 100 cc. of the solvent and the solution filtered. When required for use an equal amount of water is added. To avoid the shrinkage and hardening of tissues caused by the use of clearing agents Twort recommends that these may be replaced by butyl alcohol. A further advantage is that butyl alcohol will mix with dilute ethyl alcohol, so that absolute alcohol may be cut out of the process. Tissues were fixed in formalin-Müller, washed and placed in dilute ethyl alcohol. They were passed into 60 per cent. ethyl alcohol and thence into pure normal butyl alcohol. This was changed several times in the course of 2–3 hours, and the tissue was then passed through several changes of paraffin.

VAN SACEGHEM (R.). **Milieu de culture à la gomme arabique.** [A Gum Arabic Culture Medium.]—*Bull. Agric. Congo Belge.* 1923. Dec. Vol. 14. No. 4. p. 610.

Van Saceghem has employed for the cultivation of Pasteurella and Salmonella organisms a modification of the medium described by

COSTA and BOYER. The modification is the substitution of gum arabic for gum tragacanth. He considers that the moisture and viscosity imparted to the medium are the factors favouring growth.

STAMMERS (A. D.). **Oedema of South African Cattle.**—*British Jl. Experim. Path.* 1924. Dec. Vol. 5. No. 6. pp. 313–317.

The disease occurs after a period of prolonged drought which usually occurs from June to September in the higher altitudes in South Africa.

Three animals were condemned as unsuitable for food at Johannesburg, and since it has been suggested that oedema may be a deficiency disease it was decided to investigate the chemical changes, if any, in bone, bone marrow, adipose tissue, and muscle.

Tabular statements show the results of these analyses, and the results of analyses of normal tissue are given for comparison.

In the analyses of bone there was a definite decrease in moisture and a deficiency of protein and fat. The total ash was reduced and there was a disproportionate decrease in the phosphorus content.

There was marked replacement of adipose tissue by moisture. The bone marrow showed a decrease in fat, and the muscle showed a reduced protein content.

A few experiments were carried out with rats in which an attempt was made to reproduce the condition seen in cattle. Some evidence was obtained that a diet deficient in phosphorus tends to bring about the same state as that seen in cattle.

SEDDON (H. R.) & CARNE (H. R.). **A Peculiar Disease affecting the Ear of Pigs.**—*Queensland Agric. Jl.* 1924. Nov. Vol. 22. No. 5. pp. 375–376.

This account of the work is taken from the *Agricultural Gazette of New South Wales*, June, 1924.

The disease is of common occurrence in Queensland, and is seen most commonly among young pigs from a few weeks to four months old.

It is characterized by a peculiar alteration in the carriage of the head and sometimes unsteadiness of gait. The head is rotated to one side or the other so that the affected ear is at a lower level than the other, and in walking the animal tends to turn towards this side. There is often discharge from the eyes and nose, and general poverty of condition. Examination of the ear reveals a brownish sticky discharge in its interior. Examination has shown that in these cases there is a collection of pus in the middle ear which tends to cause rupture of the drum.

In the note under review the cause of the disease is described rather indefinitely as follows: Examination of the pus shows the presence of bacteria such as are commonly met with in other suppurative conditions in the pig.

KIMURA (T.). **On "Orchidoma" or "Orchidoblastoma" of the Horse.**—*Sei-i-Kwai Med. Jl.* 1924. Dec. Vol. 43. No. 6. pp. 1–6.

This paper contains statistics of the number and type of tumours occurring in animals slaughtered for food in Japan during the period 1908–1915.

Over 77,000 horses have been killed during this period and tumours were found in 142. During the same period over 241,000 cattle and 477,000 pigs were slaughtered. Tumours were found in 15 and 3 of these respectively.

Of the animals showing tumours 114 were horses and 28 mares, and the tumours involved the testicles in 49 instances.

The tumours occur most frequently in stallions that are fifteen years or more old, and as a rule only one testicle is involved.

Microscopic examination shows that the growths arise as the result of proliferation of the epithelium of the seminiferous tubules. Metastases via the lymphatic system are frequently seen.

CAMERON (A. E.). **Some Further Notes on Buffalo.**— *Veter. Jl.* 1924. Nov. Vol. 80. No. 11. pp. 413–418.

The author gives an account of some of the anatomical features of the American buffalo. The details were gathered during the slaughter of a large number of animals at the Buffalo Park, Wainwright, Alberta.

MALONE (R. H.). **A Simple Method of preparing Collodion Capsules for Use in the Study of Biological Problems.**—*Indian Jl. Med. Research.* 1924. Apr. Vol. 11. No. 4. pp. 1227–1229. With 1 plate.

BOOK REVIEW.

KAUPP (B. F.). [B.S., M.S., D.V.M.] **Animal Parasites and Parasitic Diseases.** Fourth Edition, revised. xvi+250 pp. With 15 plates and 81 text figs. 1925. London. Baillière, Tindall & Cox, 8, Henrietta Street, Covent Garden. [Price 12s. 6d.]

We learn from the Author's Preface that the Fourth Edition of this work "has been thoroughly brought down to date, specially revising those facts dealing with the parasites of poultry, hogs, dogs and sheep, and the best means of medication and methods of eradication of these parasites."

This brochure is presumably intended for the clinician, who may find in it some useful hints as to treatment, but the same cannot be said with regard to the all-important matter of diagnosis. The nomenclature adopted is frequently not that of the present day, for we find such terms as *Uncinaria cernua* of the sheep and goat, *Taenia canina* and *Coccidium perforans* of the dog, and in some cases, owing to the absence of a synonomy, it is difficult to trace the exact parasite to which reference is made.

In addition, no rule appears to have been followed in the selection of parasites for mention. For instance, while quite a full description is given of such a rarity as *Simondsia paradoxa* of the pig, the only members of the Trichostrongylidae mentioned as inhabiting the alimentary tract of ruminants are *Haemonchus contortus* and *Strongylus ostertagi*.

The work contains chapters on the Ectozoa, Entozoa, and Protozoa, and is profusely illustrated. Some of the illustrations in the Ectozoa section are deserving of praise, particularly those of the Mange Acari, but most of the freehand work is crude, and the micro-photographs have the usual drawbacks of this method for illustrating Helminths.

F. Ware.

TROPICAL DISEASES BUREAU.

TROPICAL VETERINARY BULLETIN.

Vol. 13.] August 31, 1925. [No. 3.

DISEASES DUE TO PROTOZOAN PARASITES.

ZEISS (Heinz). **Zur diagnostischen Hodenpunktion bei Trypanosomiase.** [Puncture of the Testicle in the Diagnosis of Trypanosomiasis.]—*Arch. f. Schiffs- u. Tropen-Hyg.* 1925. Feb. Vol. 29. No. 1. pp. 35–39.

The author has infected guineapigs with dourine by way of the prepuce and has been able to find trypanosomes subsequently in the blood and in the testicles by puncture. A small number of experiments were also carried out with the parasite of Su-auru. In this case attempts to infect by way of the prepuce failed, and the subcutaneous path was used. Parasites could not be found in the testicles of two out of the four animals infected, and when they were discovered they were in very small numbers only. The author is of the opinion that coitus plays a greater part in the transmission of trypanosome infections than has been hitherto believed.

IWANOW (Elie). **Les *Trypanosoma equiperdum* peuvent-ils pénétrer à travers les muqueuses et la peau indemnes des animaux ?** [Can *T. equiperdum* penetrate Intact Mucous Membranes or Skin.]—*C.R. Soc. Biol.* 1925. May 8. Vol. 92. No. 15. pp. 1198–1200.

The author describes in general terms some experiments in which attempts were made to infect mice with dourine by dropping blood containing immense numbers of tryanosomes into the eye. Not one out of 12 became infected, while controls inoculated subcutaneously contracted the disease.

He is of the opinion that some lesion, slight as it may be, must be present to permit of the invasion of the body through mucous membranes or skin.

YAKIMOFF (W. L.) & MATWEIEFF (W. N.). **Distribution de la dourine en Russie.** [The Distribution of Dourine in Russia.]—*Bull. Soc. Path. Exot.* 1925. Jan. 14. Vol. 18. No. 1. p. 54.

Dourine exists in practically all the studs in Russia, and in a tabular statement the authors show the number of cases occurring in 22 districts during the years 1908 to 1912. The total number was 232.

(K2707) Wt P.158/184 700 8/25 H & Sp Gp 52

YAKIMOFF (W. L.). **A propos du traitement de la dourine des chevaux par l'atoxyl.** [The Treatment of Dourine by Atoxyl.]—*Bull. Soc. Path. Exot.* 1925. Jan. 14. Vol. 18. No. 1. pp. 55–57.

This paper contains tabular statements of cases treated during the period 1910-1913.

ROSENBUSCH (F.). **Diagnostische Untersuchungen über Mal de Cadera in Argentinien.** [Investigations regarding the Diagnosis of Mal de Caderas in the Argentine.]—*Arch. f. Schiffs- u. Tropen-Hyg.* 1925. Mar. Vol. 29. No. 3. pp. 128–135. With 3 text figs.

The microscopic examination of the sediment obtained by centrifuging the cerebro-spinal fluid of animals is superior to blood examination for the detection of parasites. The fluid was withdrawn at either the occipito-atlantal or the atlanto-axial joint with a fine trochar about 12 cm. in length, and 40-50 cc. of fluid were obtained.

DONATIEN (A.) & SALORD (Chr.). **Inoculation expérimentale de *Trypanosoma berberum* à l'âne.** [The Experimental Transmission of *T. berberum* to the Donkey.]—*Bull. Soc. Path. Exot.* 1924. Dec. Vol. 17. No. 10. pp. 887–888.

So far only dromedaries, horses, and dogs have been found suffering from debab ; sheep, goats and donkeys apparently escaping infection. The susceptibility of the sheep and goat to artificial infection has been established.

The authors give details of a donkey inoculated experimentally with the parasite. They found that the course of the disease resembles that seen in dromedaries. After a brief acute phase the condition became chronic and infection was found to persist for more than three years.

YAKIMOFF (W. L.), MARCOFF (E. N.), OULASSEWITSCH (J. S.) & RASTEGAIEFF (E. F.). **Sur la répartition géographique du *Trypanosoma theileri* en Russie.** [The Distribution of *T. theileri* in Russia.]—*Bull. Soc. Path. Exot.* 1925. Jan. 14. Vol. 18. No. 1. p. 57.

The authors add the Province of Petrograd to those in which the occurrence of *T. theileri* was already known.

DIOS (R. L.) & ZUCCARINI (J. A.). **Primera comprobación de Tripanosomosis bovina en la R. Argentina.** [Bovine Trypanosomiasis in the Argentine.]—*Rev. Inst. Bact. Dept. Nac. Hyg.* 1925. Mar. Vol. 4. No. 1. pp. 80–84. With 1 plate.

A trypanosome morphologically like *T. theileri* has been detected in the Province of Entre Rios, Argentina. Inoculation and culture experiments failed.

SCHOENING (H. W.). **Complement-Fixation Tests on Serums of Cattle harbouring** *Trypanosoma americanum.*—*Amer. Jl. Trop. Med.* 1925. May. Vol. 5. No. 3. pp. 247–249.

Seventeen out of 26 normal adult cattle were found, by cultural tests, to harbour *T. americanum.* Complement fixation tests failed to reveal the presence of any detectable antigen.

NAUCK (E.). **Untersuchungen über die Wirkung des Trypanosomenheilmittels "Bayer 205."** [Experiments in the Treatment of Trypanosome Infections with "Bayer 205."]—*Arch. f. Schiffs- u. Tropen-Hyg.* 1925. Feb. Vol. 29. No. 1. pp. 1–16.

In this paper the author describes experiments carried out with mice and rabbits with a view to ascertain the manner in which "Bayer 205" effects cures. He concludes that the process is not a simple one. There is not only a change in the medium in which the parasites are—that is to say, a general effect on the body—but a direct action on the parasite itself. The latter action does not appear to be one of direct destruction, but one which prevents multiplication and produces a decrease in virulence. There is no evidence that the drug is stored up in the red corpuscles. The direct effect within the body is more marked than that produced by either atoxyl or tartar emetic.

DIOS (R. L.). **Ensayos de tratamiento preventivo y curativo con "Bayer 205."** ["Bayer 205." Curative and Protective Properties.]—*Revist. Inst. Bact. Dept. Nac. Hyg.* 1925. Mar. Vol. 4. No. 1. pp. 51–56. [English Summary.]

1. Experiments have given satisfactory results in horses and dogs inoculated with a very virulent strain of Mal de Caderas.
2. In one experiment a single dose of 4 grammes of "Bayer 205" prevented infection in a horse subsequently injected with 70 cc. of very virulent blood.

VAN SACEGHEM (R.). **Le "205 Bayer" (Naganol) et le traitement des trypanosomiases animales.** ["Bayer 205" (Naganol) and the Treatment of Animal Trypanosomiases.]—*Bull. Agric. Congo Belge.* 1924. Dec. Vol. 15. No. 4. pp. 694–697.

Intravenous injections of a solution of "Bayer 205" in doses of 5 g. of the drug per 100 kilogs. live weight in animals experimentally infected with *T. vivax* have cleared the circulation of trypanosomes for periods not exceeding seven days. Further doses administered after relapses have caused only a temporary disappearance of the parasites.

Doses of 15 grammes per 100 kilogs. live weight are fatal.

The cost of the drug, 30 francs per gramme, renders its use impossible.

BUBBERMAN (C.), DOUWES (J. B.), & VAN BERGEN (V. E. C.). **Over de Toepassing van Bayer 205 bij de surra van het paard in Nederlandsch Indië.** [The Use of "Bayer 205" in Equine Surra in the Dutch East Indies.]—*Veeartsenijkundige Mededeeling No. 50, Depart. v. Landbouw, Nijverheid en Handel,* Buitenzorg. 1925. Feb. 64 pp.

The authors refer first to the previously published experiments of RODENWALDT and DOUWES (ref. *Trop. Vet. Bull.*, Vol. 11, p. 45), and give the further history of five horses which were still under observation when that work was published. These further results (two deaths and three definite recoveries) served to confirm the conclusions at which RODENWALDT and DOUWES had already arrived, viz., that in

equine surra " Bayer 205 " should not be given to animals which are seriously ill, and that this agent, used alone, is likely to effect a cure only in the early stages of infection, the treatment of relapses being useless.

In the experiments now recorded, the authors used (with only two exceptions) cases of natural infection, and all the animals but one were native horses, weighing 150-200 kilogms.

A. *Treatment with Fractional Doses.*

1. " *Bayer* 205 " *combined with Tartar Emetic.*—Both given in 5 per cent. solution.

(*a*) Doses of ½ gm. of each drug, given alternately, with one day intervals (*i.e.*, each drug given every second day).

Four horses ; 2 died before treatment was complete, and 2 recovered (*i.e.*, discharged after more than 18 months observation).

(*b*) Doses of ½ gm., given alternately, with intervals of 2 days.

Four horses ; 1 died before treatment was complete, and 1 about 4 months after treatment. Of the other 2, 1 recovered and the other was still under observation (7 months since last relapse).

(*c*) Doses of 1 gm., alternating, with intervals of 4 days.

Six horses, of which 1 died during treatment, 1 (with nervous symptoms) soon after treatment, and 1 had to be destroyed (being infected with glanders) before the period of observation was complete. Of the others, 2 relapsed and died, and 1 recovered, but died from colic more than a year later (sub-inoculations negative).

(*d*) Doses of 1 gm., alternating, with intervals of 7 days.

Eight horses, of which 4 died long before treatment could be completed, 1 died soon after treatment (with nervous symptoms), and 1 after showing relapse. One horse was discharged as cured, and the eighth animal, still under observation, had been free from trypanosomes in the peripheral circulation for 13 months, and appeared to be cured.

Of 22 horses treated in this way, 8 (nearly all advanced cases) died during the treatment. Five horses were discharged as cured, and 2 were in good health, but still under observation ; 1 of the latter was probably cured, but the other, which had relapsed twice, would probably break down again.

The remaining 7 horses all died after treatment ; one death appears to have been due to glanders, and the animal concerned was under observation for only a short time—no trypanosomes were seen after the treatment. Three animals showed definite relapse before death, and 3, before death, suddenly developed symptoms involving the nervous system ; no sub-inoculations were made from these 3 animals, but experience of other cases leads the authors to ascribe the deaths to persisting surra infection.

All those horses which recovered had received a total dose of 10 gms. of " Bayer 205 " and, with one exception, 10 gms. of tartar emetic. The total doses of both drugs were less than 10 gms. in 5 of the 6 horses which died of surra after treatment ; in the sixth case the doses of both reached 10 gms., but they were relatively small, as the patient, an Australian mare, was much larger than the native horses.

The authors conclude that within limits the size of the fractions into which the total dose is divided, and the length of the intervals

between their administration, are not of primary importance, but that the total doses of " Bayer 205 " and emetic should not be less than 10 gms. for native horses.

Five of the 22 horses showed symptoms of Bayer intoxication; individual susceptibility varied greatly, one animal developing symptoms after receiving 2 gms., while in another the symptoms appeared only after 6·5 gms. had been given.

2. " *Bayer* 205 " *combined with Atoxyl.*

Three horses were treated, but 1 (an advanced case) died soon after treatment commenced. Of the other two, 1 died from tetanus soon after treatment, but sub-inoculations of blood, cerebro-spinal fluid, etc., gave negative results.

The third animal, an early case, received 10 gms. of each drug within 2 months—at first in doses of 2 gms., but later in 1 gm. doses; a year later it was in good health.

B. *Treatment with Large Doses.*

Practical considerations suggested the testing of the drugs in single larger doses.

3. " *Bayer* 205 " *combined with Atoxyl.*—Of each, one dose of 3 gms.

The injection of atoxyl appeared to have the same effect, whether it was given subcutaneously or intravenously, and the order of administration of the two drugs did not seem to affect the result. The interval between the two inoculations varied from 8 to 14 days, and in 3 cases the second injection was given only when relapse occurred, and trypanosomes reappeared in the blood.

Of the 5 horses treated (3 early and 2 bad cases), 1 had to be killed (as glandered) a week after the second (Bayer) injection, and sub-inoculations gave negative results. Another horse died from the effects of a severe Bayer intoxication, combined with those of an extensive eczema. The other 3 animals were in good condition, and had shown no relapse, after 9, 9 and 7 months respectively.

4. " *Bayer* 205 " *combined with Tartar Emetic.*

Experiments on 4 horses showed clearly that, where trypanosomes are present in the peripheral blood, one should not *begin* treatment with emetic, although the doses given may be considerably smaller than those quite well tolerated by horses not suffering from surra, although poor in condition. Three of the animals reacted severely to the emetic, and died or had to be killed; in the fourth case trypanosomes reappeared in the blood, but the early onset of death appears to have been due to the effects of the emetic.

The authors suggest that emetic kills the trypanosomes more quickly than the other drugs, and so causes a rapid liberation of toxic decomposition-products.

In 4 other horses, the emetic was given only after " Bayer 205 " had cleared the peripheral circulation of trypanosomes—in 2 cases only 24 hours later—and no ill-effects were seen. All 4 horses showed some symptoms of Bayer intoxication, in one case so severe that death ensued. The other 3 horses were in good condition, and had shown no relapse, after 9, 8 and 7½ months respectively.

5. *Simultaneous Treatment with "Bayer* 205 *" and Atoxyl.*

At first the atoxyl was given subcutaneously, but it was later found to be quite safe to give it intravenously, at the same time as the "Bayer 205."

Three early cases were treated in this way, and all 3 showed some symptoms of Bayer intoxication, but recovered. After the lapse of 8 months they were all in good condition, and had shown no signs of relapse.

In 5 other horses, all moderately advanced or bad cases, the simultaneous inoculation of "Bayer 205" and atoxyl was followed, after 24 hours, by the injection of emetic (1 gm. per 100 kgms. bodyweight). All developed more or less severe Bayer intoxication, and one animal, which appears to have been hyper-sensitive as well as in poor condition, died.

One horse died after developing nervous symptoms, and positive sub-inoculations showed that relapse had occurred. The treatment obviously failed in this case, and the authors admit the possibility that some of the other animals may yet relapse similarly; they believe, however, that in this case the horse was in too advanced a stage of the disease when treated, and that very advanced cases should not be treated at all.

A third horse succumbed, and post-mortem examination revealed a general degeneration of the organs; it appears not to have been infected (negative sub-inoculations).

At the time of publication, 8 months after treatment, the other 2 horses were in good health and condition, and one of them was at work.

Although the numbers involved are small, the results seem to indicate that the three-fold treatment is less promising than the combination of "Bayer 205" and atoxyl; they suggest also that atoxyl may exercise a favourable influence on the appearance of symptoms of Bayer intoxication.

The authors conclude that, although it is not yet possible to pronounce a final judgment on its value, the most promising treatment for surra appears to be the simultaneous administration of "Bayer 205" and atoxyl, both in non-lethal but slightly toxic doses.*

BAKKER (S.). **Een en ander over Surra in den ambtskring Padang Sidempoean.** [Notes on Surra in Padang Sidempoean.]—*Ned. Ind. Bladen v. Diergeneesk. en Dierenteelt.* 1925. Apr. Vol. 37. No. 2, pp. 153–177.

In Padang Sidempoean and neighbouring areas there is much evidence to suggest that transmission of surra from buffalo to buffalo occurs much more readily than from buffalo to horse. In some districts a number of buffaloes succumb, but in Padang Sidempoean there are fewer deaths, although a considerable proportion of the buffaloes harbour the trypanosome; most of these carriers are in excellent condition, and can perform their work without difficulty. The author considers that in this area one cannot say with certainty that any buffalo is free from the infection.

The cases in horses occur sporadically, in widely separated places, and infection must come from the buffalo, but if infected horses are allowed to remain alive, infection seems to spread quickly and easily to other horses. The number of sporadic cases in horses increases greatly in the second half of each year.

* Summarized by Dr. W. H. Andrews, M.R.C.V.S.

The author suggests that transmission is commonly effected in buffaloes by insects that have a distinct preference for buffalo blood, and in horses by others that tend to confine themselves to equine blood. He suggests also that in the second half of the year some insect appears which is particularly liable to transmit from buffalo to horse, and considers that these indications might be made the basis of useful entomological work on the problem.

He believes that dogs are more commonly attacked than is known, and emphasizes the importance of the symptoms connected with the eyes.

In considering the question of eradication, he emphasizes the difficulties of diagnosis in ruminants, and the impossibility of detecting all the carriers among the buffaloes. Moreover, to slaughter all the buffalo carriers, even if one could pick them out, would be impossible economically and not justifiable; and to quarantine apparently healthy carriers would obviously be useless.

The presence of the buffalo carrier renders eradication quite impossible, and he advises measures of limitation and control, as follows:—

When surra appears amongst horses, all horses in the district should be injected with 1 gm. of Bayer 205, and horses from outside the district should for a time not be admitted unless they are also inoculated. The animals could still be used, so that ordinary business would hardly suffer, and they would be protected from infection for a month (RODENWALDT & DOUWES). With a few injections one could protect the animals for 2 or 3 months, and from the practical point of view the outbreak could then be regarded as suppressed.

Outwardly healthy buffaloes would not need to be injected, where only equines had died; but where deaths did occur amongst buffaloes, all should be injected, or they should be isolated in a dark stable until 1½ months after the last death. Carriers should be slaughtered only when in bad condition (where infection is widespread, as in Padang Sidempoean).

The author tried this prophylactic injection with Naganol (Bayer 205), inoculating intravenously with 1 gm. in 5 per cent. solution. Altogether he inoculated 321 horses, in 7 batches varying in number from 26 to 71; the inoculation of one batch of 51 animals was repeated after a month. Many of these horses were from places where cases of surra were actually present at the time; the others were from places where surra had been causing losses, although there had been no cases for 10–12 days before the injections. None of the injected horses developed surra, and there were no complications; in no case did the Naganol cause anything more than a slight oedema, which disappeared spontaneously.

Four infected animals were treated, two with Naganol and tartar emetic, and two with atoxyl in addition to these two drugs. The Naganol was given in amounts varying from 1 to 4 gms., the total quantities administered varying from 4 to 9·2 gms., and the emetic in ½ or (usually) 1 gm. doses, with total amounts of from 3 to 4 gms. Atoxyl was given in doses of 2½ or 3 gms., with totals of 3 and 5½ gms. One of the horses died after nearly 2 months, showing paresis, etc.; a dog was inoculated with blood drawn from it on the 35th day of the treatment, but it did not become affected, and no trypanosomes reappeared in the horse's circulation; another of the horses was in good condition, etc., more than 2 months after treatment, but showed some signs of paresis in rising, and prognosis was doubtful. The

other two horses were in good condition, and showed no parasites in the blood, months after the treatment started. The animals were native horses weighing 140–150kg. No serious effects were caused by the drugs administered.

The author admits that it is still too early to judge the value of the treatment, but considers it hopeful. He emphasizes the fact that the public were keen on the drug treatment, either prophylactic or curative, whereas they are always hostile to measures involving slaughter.*

MOSCHKOWSKY (Sch.). **Über die Einwirkung von Germanin ("Bayer 205") auf Leishmanien.** [The Effects of "Bayer 205" upon Leishmania.]—*Arch. f. Schiffs- u. Tropen-Hyg.* 1925. Feb. Vol. 29. No. 1. pp. 40-44.

The author details experiments in which "Bayer 205" was used *in vitro* on cases of oriental sore and of kala azar. In no case did the drug exert any effect.

ROSENBUSCH (F.) & GONZALEZ (R.). **Beitrag zum Studium der *Tristeza*. I. Mitteilung.** [A Contribution to the Investigation of Tristeza.]—*Arch. f. Protist.* 1925. Apr. 1. Vol. 50. No. 3. pp. 443–485. With 1 map & 8 charts in text.

The authors use the term Tristeza to cover infections with Babesia and Anaplasma in cattle.

The greater part of the paper is taken up with an account of the distribution of Tristeza in the Argentine and details of experimental inoculations. Babesiasis and anaplasmosis occur in all the tick areas. The two infections may be separated from each other experimentally by taking advantage of the fact that the incubation periods are markedly different.

Babesia infection, set up by inoculation, shows an incubation period ranging from 3 to 18 days, while in the case of anaplasmosis it varies from 17 to 35 days.

In Babesia infections intravenous inoculation shortens the periods of incubation, but the dose of infective blood given does not influence it. On the other hand, the greater the amount of blood given the shorter the period of incubation in the case of anaplasmosis, but the path of infection exerts no influence upon it.

It has not been found possible to recognize any constant morphological differences between Babesia virus from different Provinces.

After recovery from Babesiasis cattle usually harbour the parasite for from 5 to 12 months, after which recovery is complete; but in the case of anaplasmosis it would appear that infection is life long. The authors have established the infectivity of blood from an animal which was infected six years previously.

The serum from blood containing anaplasma is non-infective, the virus being present in the corpuscles only. The addition of hypotonic salt solution, leading to haemolysis, rapidly destroys the anaplasma.

The serum of cattle having latent Babesia infection has a lytic action on Babesia, but there is no similar action in Anaplasma infections.

The facts appear to suggest that while the anaplasmosis of the

* Summarized by Dr. W. H. Andrews, M.R.C.V.S.

Argentine is all of one type, the Babesiasis is not. Animals recovered from Anaplasmosis cannot be re-infected with any strains, but immunity to Babesiasis in one area does not protect animals against virus from other parts.

FONSECA (A.) & BRAGA (A.). **Noções sobre a Tristeza parasitaria dos Bovinos.** [Bovine Tristeza.] 216 pp. With numerous text figs. & charts. 1924. Rio de Janeiro: Officinas Typographicas do Ministerio da Agricultura.

This publication, which issues from the Veterinary Experimental Station of Rio de Janeiro, is a full account of tristeza, which, according to the authors, covers piroplasmosis and anaplasmosis.

CERNAIANU (C.). **Sur une épizootie de piroplasmose vraie du cheval et son agent vecteur.** [An Epizootic of Equine Piroplasmosis and the Transmitting Agent.]—*C.R. Soc. Biol.* 1925. Mar. 13. Vol. 92. No. 9. pp. 730-731.

The author describes an outbreak of equine piroplasmosis caused by *P. caballi* in Balti (Roumania) and the neighbouring villages. The epizootic lasted about two months, from April 15th to June 10th. A second outbreak occurred in October.

The only ticks found were *Dermacentor reticulatus*.

YAKIMOFF (W. L.), WASSILEWSKY (W. Z.) & ZAWIALOFF (B.). **La piroplasmose des bovidés dans le gouvernement de Pétrograde en 1923. (Note préliminaire.)** [Bovine Piroplasmosis in Petrograd in 1923. Preliminary Note.]—*Bull. Soc. Path. Exot.* 1925. Jan. 14. Vol. 18. No. 1. pp. 48–49.

In 1923, 100 milch cows were imported into the Louga district from Yaroslav, which is free from piroplasmosis. Twelve days after they were put at pasture 11 cases of piroplasmosis occurred, and of these seven proved fatal. Haemoglobinuria was observed on the 2nd or 3rd day after the rise of temperature. Diarrhoea, which was seen in the early stages, was followed by constipation on the 3rd or 4th day. The blood count fell to about 3,000,000, and more than 30 per cent. of the red corpuscles contained parasites.

Cases were treated with trypanblue, ichtargan, and luargol. The last of these appeared to cause the most rapid disappearance of parasites from the blood (72 hours), and the urine cleared within 24 hours of its administration.

In 25 per cent. of the cases there was a relapse in 17 to 35 days after treatment with a reappearance of parasites. These, however, were benign, and recovery took place without further treatment.

The parasite was *B. bovis*.

YAKIMOFF (W. L.). **La lutte anti-piroplasmique dans le gouvernement de Pétrograde en 1924. (Note préliminaire.)** [The Campaign against Piroplasmosis in Petrograd in 1924. Preliminary Note.]—*Bull. Soc. Path. Exot.* 1925. Jan. 14. Vol. 18. No. 1. p. 50.

In 1924 the average loss from piroplasmosis in the Province of Petrograd was 31 per cent.

In four selected districts trypanblue, ichtargan and luargol were used

intravenously. The great majority of animals (309) were treated with the first of these, 271 animals receiving treatment on the 1st or 2nd day of illness, the remainder on the 3rd to the 5th day. The mortality was 8 per cent. Seven animals were given 1 gramme of ichtargan and three luargol. All of these recovered.

YAKIMOFF (W. L.), WASSILEWSKY (W. J.), IWANTSCHIKOFF (M. F.), RASTEGAÏEFF (E. F.), OULASSÉWITSCH (J. S.) & ZAWIALOFF (B. W.). **Action de l'ichtargan et du luargol dans la piroplasmose bovine.** [The Action of Ichtargan and Luargol in Bovine Piroplasmosis.]—*Bull. Soc. Path. Exot.* 1925. Jan. 14. Vol. 18. No. 1. pp. 51–53.

This paper contains a detailed account of nine animals treated with Ichtargan and four with Luargol during the outbreak of Piroplasmosis in the Province of Petrograd during 1923 and 1924. A single dose was given intravenously in each case, and ranged from 0·4 to 1 gramme.

A tabular statement shows that after Ichtargan haemoglobinuria disappeared within 12 to 48 hours, and recovery took place within 24 to 72 hours. In the case of Luargol the haemoglobin disappeared from the urine in 24 to 72 hours and complete recovery occurred within the same periods.

JAKIMOW [YAKIMOFF] (W. L.), WASSILEWSKAJA (W.), BENDINGER (G.), IWANTSCHIKOW (M.), MARKOWA (E.) & ULASSEWITSCH (V.). **Zur Frage über die russischen Rinderpiroplasmosen. III. Verhältnis der nord-westlichen Piroplasmose zu anderen von demselben Typus. IV. Veränderungen des Blutes bei nord-west Piroplasmose.** [The Russian Piroplasmoses.]—*Rev. Microbiol. et Epidemiol.* 1925. Vol. 4. No. 1. pp. 84–85.

Yakimoff, in this brief German abstract of a paper in Russian, states that "our north-west piroplasma (*B. bovis*) is identical with *B. divergens.*"

Regarding the changes observed in the blood in these cases, the following details are given :—

There is a reduction in the number of red corpuscles. Anisocytosis, polychromatophilia, poikilocytosis, and normoblasts are observed.

After treatment, macrocytes with basophil stipplings make their appearance, generally about the 3rd day, and usually prior to the disappearance of the parasites.

The leucocyte count on the 1st day of haemoglobinuria in two cows was found to be normal. There is a rise when relapses occur. The leucocyte formula changes in the direction of an increase in mononuclears.

KINGSBURY (A. Neave). **On the Occurrence of** *Piroplasma* (*Babesia*) *canis* **in Malaya.**—*Parasitology.* 1925. May. Vol. 17. No. 2. pp. 190–191.

The author records the occurrence of canine piroplasmosis in Malaya. In the first case a microscopic examination of the blood revealed the parasite. In the second case parasites were not recognizable in the blood, but the inoculation of a puppy caused the disease.

The transmitting agent is in all probability *R. sanguineus.*

BEVAN (Ll. E. W.). **East Coast Fever—the Theory of Latency.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1924. Nov. 20 & Dec. 11. Vol. 18. Nos. 5 & 6. pp. 328–335.

Steps are being taken to ascertain whether GONDER'S account of *Theileria parva* and its life history—more particularly in the vertebrate host—is accurate in every particular. Practical experience appears to indicate that, contrary to what has been held for a good many years, complete recovery does not always occur when an animal survives an attack of East Coast fever. There would appear to be some reason for supposing that the parasite may persist in the ox in some unrecognized form or in some organ, and that such parasites may be the cause of recrudescences of the disease.

RHODESIA. **Report of Veterinary Conference held at Bulawayo on the 4th, 5th and 6th November, 1924.**—Issued by Authority of the Minister of Agriculture. Salisbury: Argus P. & P. Co., Ltd. pp. 2–44.

The main discussions of this Conference centred about the question as to whether an animal which has recovered from East Coast fever is entirely free from the causal organism or not.

LESTOQUARD (F.). **Troisième note sur les piroplasmoses du mouton en Algérie. La piroplasmose vraie :** *Piroplasma* (*s.str.*) *ovis* (*n. sp.*). **Comparaison avec** *Babesiella ovis.* [True Piroplasmosis of Sheep in Algeria. Comparison between *Piroplasma ovis* and *Babesiella ovis.*]—*Bull. Soc. Path. Exot.* 1925. Feb. 11. Vol. 18. No. 2. pp. 140–145. With 12 text figs.

Piroplasmosis in sheep appears to have been generally accepted as a single entity caused by one type of parasite only, but it appears to be not improbable that this is in reality an error.

Lestoquard has been able to identify the parasite known as *Babesiella ovis* in Algerian sheep, and now describes *Piroplasma* (*sen. str.*) *ovis.*

The parasite belongs to the genus Piroplasma and sub-genus Piroplasma. Typically, it occurs in the twin form, the parasites forming an acute angle with each other, and each having a length exceeding, or at least equal to, the radius of the red corpuscle. The average length is 3 microns.

The parasite is readily inoculable. It causes an acute attack which is followed by a prolonged chronic infection.

The period of incubation in experimental cases depends upon the source of the virus. If it is taken from an animal that has been infected for a long time, it, as a rule, exceeds a week, but by progressive rapid passage this period may be reduced to 3-6 days, or even less.

When infection occurs the temperature rises, and remains elevated for 4 to 8 days, parasites appearing in the blood at the same time. In some cases parasites persist in the blood in recognizable numbers after the temperature has fallen, but this is not usually the case. On an average only 1 per cent. of the corpuscles become invaded.

In experimental cases the destruction of red corpuscles may amount to 50 per cent. Jaundice and haemoglobinuria do not as a rule occur, but both may be observed.

Recovery, as a rule, takes place, but not invariably. In fatal cases anaemia and splenomegaly are the principal lesions.

The infection occurs naturally in, and can be experimentally transmitted to, the goat.

Trypanblue has a marked curative effect. It is administered intravenously in 1 per cent. solution; the dose being 0·01 g. per kilog. live weight.

In addition to the twin-pear-shaped forms, rounded, oval, and irregularly shaped parasites occur.

The parasite does not cause any increase in size of the corpuscle in the sheep, but in the goat infected corpuscles become enlarged. This is no doubt due to the fact that normally the corpuscles of the goat are distinctly smaller than those of the sheep.

The following differences are noted between *Piroplasma ovis* and *Babesiella ovis*:—

P. ovis is larger than *B. ovis*. In *P. ovis* pear-shaped forms predominate. In *B. ovis* round forms are most numerous. Where twin forms occur in *B. ovis* they form a very obtuse angle with each other. By passage it is easier to obtain an exaltation of virulence with *P. ovis* than with *B. ovis*. The anaemia which results from infection with *B. ovis* is the more severe, although the percentage of parasites invaded is smaller.

There is no cross immunity.

Trypanblue is effective in cases of infection with *P. ovis*, but is without effect in cases of infection with *B. ovis*.

PÉRARD (H.). **Recherches sur les coccidies et les coccidioses du lapin. Prophylaxie des coccidioses.** [Investigations regarding Coccidia and Coccidiosis of the Rabbit. Prophylactic Measures.]—Thèse pour le Doctorat Vétérinaire. Ecole Nat. Vét. Alfort. 1925. pp. 5–71. With 5 text figs.

The difficulties in the way of exact experimentation in connection with Coccidiosis in rabbits are very great, since practically every adult rabbit harbours parasites, and it is extremely difficult to obtain young rabbits—which alone are suitable for experiment—which have not been exposed to infection, and which can be kept free from infection. A further difficulty is to obtain a pure strain for infection. The author finds that *E. stiedae* and *E. perforans* are separate entities. The average size of *E. stiedae* is $37{\cdot}5 \times 21{\cdot}5\mu$, while that of *E. perforans* is $25{\cdot}5 \times 15{\cdot}5\mu$. The majority of the oocysts of *E. perforans* fall within 24-30μ in length, and of *E. stiedae* 90 per cent. are from 35-40μ in length.

The cyst wall of *E. stiedae* appears to be a little thinner than that of *E. perforans*.

A far greater percentage of parasites belonging to *E. stiedae* show micropyles than is the case with *E. perforans*. It is noticeable that when the micropyle is open the oocysts acquire a yellowish tint.

Sporulation occupies about the same length of time in the two species. Some of the parasites sporulate within two days, but the majority require 8 to 10 for the process.

In *E. perforans* the so-called residual body is always present as a fifth body in the sporulated oocyst. This structure the author believes is partly composed of a reserve of food material since it decreases in size with age, but it never disappears. In *E. stiedae*

there is no separate residual body in the oocysts, but a corresponding structure is found in each of the sporocysts. The wall of the sporocysts in *E. stiedae* is relatively thicker than that of *E. perforans*. A number of experiments have been carried out with a view to infect white rats and mice, dogs, sheep and goats with the parasites of the rabbit, but without success.

The influence of temperature upon sporulation: At 0° C. no segmentation takes place. At 5-6° C. segmentation begins about the 5th day and is complete by the end of the 2nd week. At 18-20° C. the process may be more rapid. Some of the parasites will have sporulated by the end of the 2nd day (*E. perforans*). At 38° C. *E. perforans* may be completely sporulated in 30 hours. *E. stiedae* does not sporulate at the temperature. Under no conditions, apparently, is sporulation complete in *E. stiedae* in less than 60 hours.

While at 38° C. *E. perforans* may develop within 30 hours, it is observed that a considerable proportion of the parasites do not complete the process; it appears to be arrested. Moisture is necessary, since parasites contained in faeces left exposed in the laboratory are not viable after the 3rd day.

Experiments show that exposure to air is necessary for the process of sporulation. Bacterial growth hinders or stops segmentation of oocysts.

A large number of substances have been tested with regard to their sterilizing effects, either chemical or physical, upon sporulated coccidia. Cresyl, lysol, and ammonia were found to be the most effective. 2 per cent. cresyl kills all the oocysts in 36 hours. In a 5 per cent. solution the majority are killed in 2 hours, but a period of 36 hours is required for the certain destruction of all of them. Lysol gives slightly inferior results. Ordinary "antiseptics" favour the process of sporulation by checking bacterial growth.

A 10 per cent. solution of ammonia proves fatal in about 24 hours.

The physical effects of desiccation, heat dry and moist, and cold were investigated. Desiccation alone is ineffective until a temperature of 38° C. is reached. At this temperature the question of heat comes into consideration. At 40° C. the oocysts are killed. As the temperature rises death takes place early. At 45° an hour's exposure is sufficient. At 55° C., 15 minutes exposure proves fatal.

The results obtained with moist heat were comparable to those given by dry heat. At 55° C. all oocysts were dead after 30 minutes. At 80° C. 5 to 10 seconds was sufficient.

While dry heat causes shrinkage, oocysts exposed to moist heat retain their normal appearance.

At low temperatures — 10 to — 15° C. oocysts directly exposed to the refrigerant are mostly killed, but in the centre of faecal pellets only about 50 per cent. of both *E. stiedae* and *E. perforans* are killed. The period of exposure does not appear to be mentioned. While most of the experiments were carried out with non-sporulating oocysts, because of the ease with which it could be ascertained whether they were killed or not, the point had not to be lost sight of that it is in the sporulated condition that the parasite remains in the outer world. The presence of a double protective layer—oocyst and sporocyst—in this phase might influence the vitality of the parasite and its powers of resistance.

The general inference drawn by the author is that sporulated oocysts are more resistant to disinfectants than non-sporulated parasites.

Prophylactic measures are largely based upon a knowledge of the life-history of the parasite, and essentially comprise the removal of the faeces as frequently as possible. In the case of small animals cages with gratings as floors are advisable so that the faeces may fall through, and thus may not contaminate the foodstuffs. A similar result may be achieved by moving the animals to fresh cages at required intervals. In the case of the larger animals—sheep and goats—the same principle is acted upon. Disinfection is best carried out by heat either moist or dry, that is to say, with boiling water or with a flame. The use of sulphates and other chemicals on infected pastures is useless.

SPIEGL (A.). **Ein bisher nicht bekanntes Kokzid beim Schaf.** [A Hitherto Unknown Coccidium of the Sheep.]—*Zeitsch. f. Infektionskrankh. parasit. Krankh. u. Hyg. d. Haust.* 1925. May 1. Vol. 28. No. 1. pp. 42-46.

The parasite described in this paper was found in two separate flocks in different districts in Saxony.

The oocysts measured 42 to 50·4 μ in length by 30·6-36·0 μ in breadth. The colour was a dark yellowish brown, and the contents were less clearly seen than in the common parasite of the sheep *E. faurei*. The oocyst wall was remarkably thick, measuring 3·6 μ, and was composed of two distinct layers. The inner was smooth, but the outer showed a delicate net-like wrinkling. No intermediate forms between this parasite and *E. faurei*, which was also present in large numbers, could be found.

The name *Eimeria intricata* is suggested.

MITCHELL (D. T.). **Coccidiosis in Poultry.**—*Jl. Dept. Agric. S. Africa.* 1925. May. Vol. 10. No. 5. pp. 408–416.

This paper was read before the South African Poultry Association Conference, Kimberley, January 7, 1925, and is in the nature of a résumé of our knowledge on the subject.

TRIFFITT (M. J.). **Observations on** *Gastrocystis gilruthi*, **a Parasite of Sheep in Britain.**—*Protozoology* (a Supplement of the *Journal of Helminthology*). 1925. May. No. 1. pp. 7–18. With 2 text figs. & 26 figs. on 2 plates.

This paper confirms and elaborates the description of the parasite given by GILRUTH (1910) and CHATTON.

The writer has examined 138 stomachs (abomasum) and the parasite has been detected in 92 per cent. of these by macroscopic examination. As early infections are probably not recognizable without microscopic examinations the actual percentage of infected animals is probably higher.

The parasites have been detected in the mucosa of the abomasum only. The largest are recognizable as whitish bodies embedded in the mucous membrane approximately 1 mm. in their longer diameter. Intact cysts could be extruded by slight pressure.

On microscopic examination the cysts were found with their long axis parallel with the gastric glands lying from 0·3 to 0·7 mm. below the surface of the membranes. They were surrounded by a small

celled infiltration. The cyst wall comprises two distinct layers with a thin zone between them in the case of the younger cysts. The outer part of the outer layer had a brush-like appearance owing to the presence of hair-like processes measuring some 18μ in length.

The cyst wall contains a single large nucleus measuring from 80-100μ by 40-60μ situated between the two layers.

The contents of the cysts are plasmodial in the young stages with a number of scattered nuclei. Subsequently, a number of cytoplasmic spheres are formed and from these spores develop. There is a residual mass of cytoplasm.

The spores are elongated slightly curved bodies with one end rounded and the other tapering. The mature ones measure 12μ by 2·5μ. Examination failed to show any evidence of cellulose in the structures.

Success did not attend attempts to cultivate the parasite, but changes were produced in spores when placed in 1 per cent. glucose similar to those described by MacGowan as occurring in spores of *Sarcocystis tenella* when placed in the same liquid.

It is suggested that *Sarcocystis tenella* is an aberrant form of *Gastrocystis gilruthi*, the invasion of the muscular system having been brought about by the escape of spores into the blood stream.

Yakimoff (W. L.), Wassilewsky (W. J.), Zwietkoff (N. A.). **Influence du chlorure de sodium sur les cultures de protozoaires.** [The Effect of Sodium Chloride upon Cultures of Protozoa.]—*Bull. Soc. Path. Exot.* 1925. Mar. 11. Vol. 18. No. 3. pp. 261–265.

An excess of sodium chloride is injurious to protozoa in culture. For the best results it should not exceed 0·25 per cent. For some organisms, *e.g.*, Oicomonas, a concentration of 0·01 per cent. is sufficient.

Yakimoff (W. L.), Wassilewsky (W. J.), & Zwietkoff (N. A.). **Sur la culture des protozoaires de l'intestin.** [The Cultivation of Intestinal Protozoa.]—*Bull. Soc. Path. Exot.* 1925. Mar. 11. Vol. 18. No. 3. pp. 260–261.

The authors find that the best medium is that described by Frosch & Schardinger, viz., ordinary broth, 10, water, 90, agar, 1-2.

On this medium Oicomonas, Piromonas, Prowazekia, Colpoda, and other organisms from the intestines of animals have been cultivated. This medium is not suitable for Lamblia, Chilomastix, Trichomonas, Octomitus, Trichomastix, and Spirochaetes.

Boschenko (W. P.). **Infusorien des Darmtrakts des Kamels.** [The Intestinal Infusoria of Camels.]—*Rev. Microbiol. & Epidemiol.* 1925. Vol. 4. No. 1. pp. 90–91.

This abstract contains a brief account of an infusiorian which the author places in the Family Isotrichidae and order Holotricha. It was found in the faeces of camels. The name given is *Infundibulorium cameli*, n. g., n. sp.

BONNE (C.). **Comparaison du spirochète des rats d'Amsterdam avec une souche française de spirochétose ictéro-hémorragique.** [A Comparison between the Spirochaete of Rats from Amsterdam and a French Strain of the Ictero-haemorrhagic Spirochaetosis.]— *Ann. Inst. Pasteur.* 1925. Jan. Vol. 39. No. 1. pp. 35–44.

In culture—diluted rabbit serum—the rat strain at first grew rather sparingly, but subsequently the cultures were as rich as those given by the other organism. The majority were 7 to 10μ in length, but forms measuring up to 50μ were occasionally seen. Morphologically the two strains could not be distinguished.

Both strains were very virulent for the guineapig, but jaundice was not invariably produced. The interval elapsing between inoculation and death was 4 or 15 days. In very rare cases guineapigs which had developed jaundice recovered. In a single batch of guineapigs which have died it is sometimes possible to find the organism in the liver in large numbers, and in other cases they cannot be detected either microscopically or by inoculation of further animals. The strains have been tested by agglutination with sera from a number of cases of infection in human beings, but no definite differences have been found.

The spirochaetes were found to be mutually protective.

OKELL (C. C.), DALLING (T.), & PUGH (L. P.). **Leptospiral Jaundice in Dogs (Yellows).**— *Veter. Jl.* 1925. Jan. Vol. 81. No. 1. pp. 3–35.

Enzootic jaundice occurs in all parts of Britain, but is more common in the country, and among kennels of sporting dogs, than in towns. It may be very fatal, the mortality reaching 95 per cent.

Clinically, hyperacute haemorrhagic and icteric types of the disease can be distinguished, but all gradations between may be observed.

The hyperacute type is characterized by its sudden onset, high temperature, which falls before death, depression, pain in the muscles of the neck and abdomen, bronchial catarrh and epistaxis, herpes of the lips and bleeding from the gums, vomiting, great thirst, blood-stained soft faeces, swelling of the face below the eyes, enlargement of the cervical glands, petechiae of the skin, conjunctivitis, but, as a rule, no jaundice.

Icteric type.—The onset may be acute or insidious. When there is well marked jaundice the temperature is generally 102° to 103° F. This falls below normal before death. Depression becomes more marked as the disease progresses. There may be bronchial râles and epistaxis is only seen occasionally. Vomiting is fairly constant, and blood may be present in the vomit. Constipation is marked, and the faeces are clay-coloured. Intussusception is frequently the immediate cause of death. The urine is dark in colour and contains albumen. Pruritus is common, and there may be conjunctivitis. Associated with acute cases there are sometimes observed cases in which there is slight fever and transient gastro-intestinal disturbance. Proof is as yet lacking that these are mild cases of the same disease. In naturally-occurring cases there is a variable amount of jaundice, but in the hyperacute cases this may be absent. There may be catarrh of the eyes and nose, and blood-stained saliva may escape from the mouth. The serous membranes may show petechiae or haemorrhages. Similar lesions may be present in the stomach. The

intestines may be severely inflamed. The liver and kidneys vary in appearance. They may be congested or pallid. The lungs show haemorrhages scattered over the surface.

In 3 cases out of 10 a leptospira was isolated which appeared to be identical with a rat strain of *L. icterohaemorrhagiae.* To explain some of their experimental results the authors invoke the theory of granule or ultra-visible forms of the parasite.

In the kennels from which natural cases were obtained rats were present, and in two outbreaks virulent leptospira were isolated from rats on the premises.

Protective serum has been prepared and used, and in nine cases it has been reported that a cure has been effected by its means.

KLARENBEEK (A.). **Uraemie, Stuttgarter Hundeseuche en Spirochaeten.** [Spirochaetes in Uraemia and Stuttgart Disease in the Dog.]—*Tijdsch. v. Diergeeneesk.* 1925. Mar. 1. Vol. 52. No. 5. pp. 222–223. With 1 plate.

The author records the occurrence of spirochaetes in the kidney in a case of uraemia in a dog.

SCHMID (G.). **Beobachtungen über eine ansteckende Hautkrankheit bei Ferkelen Verursacht durch Spirochäten.** [A Contagious Disease of the Skin of Pigs caused by a Spirochaete.]—*Berlin. Tierärzt. Wochensch.* 1925. May 29. Vol. 41. No. 22. pp. 340–342.

The author describes a disease occurring in South West Africa in which lesions of the skin of pigs are associated with the presence of spirochaetes. Tumour-like swellings were found in different parts of the body, but usually on some portion of the head.

In the case recorded by the author one pig out of seven affected was available for examination. There was a large ulcerating swelling on the side of the face, and the deeper structures had become involved, so that when the bones were boiled out the alveoli of the incisors were found to have become exposed, allowing the teeth to drop out. Microscopic examination of smears showed that the bacteria present were greatly outnumbered by spirochaetes. Subsequently, he received for examination a live pig affected with the disease. This was a sow-pig about four months old. Between the eye and the ear on the left side there was a tumour-like growth involving the skin, which was covered with a dry grey scab. On removing this there was found a deep defect in the tissues filled with a greasy glutinous material. The margins of the lesions were swollen and bled readily. While the animal was under observation the lesion steadily extended.

A few days after the pig was first seen by the author a hard painful swelling developed in the upper lip, and this in the course of a few weeks attained the size of a hen's egg. This soon came to a head; a grey glutinous pus was obtained from it. During the 5 months that the animal was under observation its general condition remained fairly good. There were occasional rises of temperature and some dullness, but these symptoms were intermittent. Spirochaetes were present in immense numbers in the material obtained from the lesions. They were never in a state of purity, but they always greatly outnumbered the bacteria present. Spirochaetes were never discovered in the blood, nor were there any signs of anaemia, as described by DODD in South Africa.

Treatment with doses of 2 to 5 cc. of 5 per cent. solution of atoxyl continued for about a month effected a practically complete cure of the skin lesions, but before healing was complete the pig unfortunately died unexpectedly. At the post-mortem examination, apart from a slight increase in the amount of cerebro-spinal fluid and marked congestion of the dura mater, no lesions were discovered in the internal organs. In the frontal sinus small collections of caseous pus were found. The bones in the areas involved were greatly reduced in thickness, and in some places actually destroyed.

BRUNI (N.). **Recherches sur quelques phytoparasites de nature protozoaire.** [Some Protozoan Parasites of Plants.]—*Bull. Soc. Path. Exot.* 1925. Mar. 11. Vol. 18. No. 3. pp. 251–256. With 3 text figs.

DESCHIENS (R.). *Giardia cati* **(n. sp.) du chat domestique.** [*Giardia cati* (n. sp.) of the Domestic Cat.]—*C. R. Soc. Biol.* 1925. May 15. Vol. 92. No. 16. pp. 1271–1272.

FRANCHINI (G.). **Piroplasmose chez un petit loir** (*Myoxus avellanarius*). [Piroplasmosis in a Dormouse.]—*Bull. Soc. Path. Exot.* 1924. Dec. Vol. 17. No. 10. pp. 881–883. With 1 text fig.

FRANCHINI (G.). **Hématozoaires particuliers d'un oiseau** (*Hypoleis hypoleis*). [Haematozoa of *Hypoleis hypoleis*.]—*Bull. Soc. Path. Exot.* 1924. Dec. Vol. 17. No. 10. pp. 884–885. With 1 text fig.

GERLACH (F.). **Über die Geflügel spirochätose in Oesterreich.** [Avian Spirochaetoses in Austria.]—*Seuchenbekämpfung.* 1925. Vol. 2. No. 3–4. pp. 189–195. With 5 text figs.

HEGNER (R. W.). *Giardia felis* **n. sp. from the Domestic Cat and Giardias from Birds.**—*Amer. Jl. Hyg.* 1925. May. Vol. 5. No. 3. pp. 258–273.

IWANOW (Elie). **Les** *Trypanosoma equiperdum* **dans le corps des chenilles de** *Galleria mellonella*. [Trypanosoma in the Bodies of Caterpillars of *Galleria mellonella*.]—*C. R. Soc. Biol.* 1925. May 15. Vol. 92. No. 16. pp. 1286–1287.

NIESCHULZ (O.). **Über die Entwicklung des Taubencoccids** *Eimeria pfeifferi* **(Labbé 1896).** [The Development of *E. pfeifferi*—Coccidium of the Pigeon.]—*Arch. f. Protist.* 1925. June. Vol. 51. No. 3. pp. 479–494.

NOLLER (W.) & RUPPERT (H.). **Zur Kenntnis der verbreitung des Taubenkokzids** *Eimeria pfeifferi*. [The Distribution of *Eimeria pfeifferi* of the Pigeon.]—*Berlin. Tierarzt. Wochensch.* 1925. Apr. 24. Vol. 41. No. 17. pp. 257–258.

PANISSET (L.) & VERGE (J.). **Presence de Spirochètes chez les chiens atteints de gastro-enterite hémorragique.** [The Presence of Spirochaetes in Dogs suffering from Haemorrhagic Gastro-Enteritis.]—*C. R. Acad. Sci.* 1925. Apr. 27. Vol. 180. No. 17. pp. 1296–1297.
[This paper has appeared elsewhere and has been dealt with.]

PETROCHI (J.) & ZUCCARINI (J. A.). **Sobre la presencia del** *Plasmodium danilewskyi* **y de Haemoproteus sp. en la sangre de los gorriones** (*Passer domesticus*) **de Buenos Aires.** [The Presence of *Plasmodium danilewskyi* and Haemoproteus sp. in *Passer domesticus* in Buenos Aires.]—*Rev. Inst. Bact. Dept. Nac. Hyg.* 1925. Mar. Vol. 4. No. 1. pp. 57–62. With 1 plate and 1 text fig.

PHISALIX (Mme.). **Coccidiose intestinale de** *Vipera berus* **à** *Cyclospora babaulti*. [Intestinal Coccidiosis of a Viper caused by *Cyclospora babaulti*.]—*Bull. Soc. Path. Exot.* 1924. Dec. Vol. 17. No. 10. pp. 868–871. With 14 text figs.

PHISALIX (Mme.). *Cyclospora tropidonoti*, **nov. spec., Coccidie intestinale de la couleuvre à Collier.** [*Cyclospora tropidonoti* n. sp., Intestinal Coccidium of Collier's Adder.]—*Bull. Soc. Path. Exot.* 1924. Dec. Vol. 17. No. 10. pp. 871–873. With 8 text figs.

PHISALIX (Mme. M.). *Coccidium persicum*, **nov. sp., parasite des voies biliaires de** *Tropidonotus natrix*, **var.** *persa* **Pallas.** [*Coccidium persicum* n. sp., in the Bile Ducts of *Tropidonotus natrix*, var. *persa* Pallas.]—*Bull. Soc. Path. Exot.* 1925. Jan. Vol. 18. No. 1. pp. 23–28. With 1 text fig.

THOMSON (J. G.). **A Giardia parasitic in a Bursate Nematode living in the Viscacha.**—*Protozoology.* (A Supplement to the *Jl. of Helminth.*) 1925. May. No. 1. pp. 1–6. With 3 text figs.

VILLELA (E.) & TORRES (C. Magarinos). **Lésions histo-pathologiques dans la paralysie expérimentale à** *Schizotrypanum cruzi* **chez le chien. Nature des cellules contenant le parasite dans le système nerveux central.** [The Histological Changes caused in Dogs infected experimentally with *Schizotrypanum cruzi*. The Nature of the Cells in which the Parasite is found in the Central Nervous System.]—*C. R. Soc. Biol.* 1925. June 19. Vol. 93. No. 21. pp. 133–135.

DISEASES DUE TO METAZOAN PARASITES.

KRANEVELD (F. C.). **Bijdrage tot de Therapie der Distomatosis in Ned. Indië.** [Contribution to the Therapeutics of Distomatosis in the Dutch Indies.]—*Veeartsenijkundige Mededeeling No. 49. Dept. v. Landbouw, Nijverheid en Handel.* Buitenzorg. 1924. 62 pp.

Fluke infestation occurs very widely in the Dutch East Indies, in cattle, sheep and buffaloes; in buffaloes and native cattle the infestations are usually light, and are only detected after death, but much more serious effects are commonly seen in milch cattle and breeding stock imported from Bengal or Europe.

The author points out that distol must be kept in a dry and cool place, and he emphasizes the importance of correct dosage in relation to body-weight.

His experiments were performed on slaughter stock, so as to be certain of the chance of performing autopsies soon after treatment; the cattle, all Java-Bengal crosses, were oxen of 2-6 years of age and weighing from 165 to 286 kilogms., while the buffaloes were oxen aged from 4 to 9 years, with weights varying from 239 to 319 kilogms.

The author attempted first to estimate the number of flukes present in each animal by counting the eggs passed out in the faeces, as recommended by MAREK. MAREK'S technique was followed, but the firmer consistence of the faeces (as compared with that usually observed in Europe) rendered it necessary to dilute with three times the volume of water, instead of the two volumes recommended.

After preliminary weighing and clinical examination, the animals were kept untreated for 5-8 days, while the faeces were examined daily for eggs. They were then weighed again, and distol was administered on four successive days, usually before the morning feed; Kraneveld advises that the capsules should be greased with a little oil, or kept for a time in lukewarm water.

The examinations of the faeces were continued during the treatment, and for 4-10 days afterwards. The author remarks that the counting of the eggs demands some experience, as *Paramphistomum explanatum* is also very commonly found in cattle in the Dutch Indies, and the eggs of this species may be mistaken for those of *Fasciola hepatica*. He also states that the occurrence of a few eggs in the faeces, for a few days after treatment, does not necessarily indicate the survival of any flukes, as eggs may remain in the gall-bladder for days.

The animals were again weighed (4-14 days after treatment) and then slaughtered; the autopsy was begun within half an hour, and the examination of the liver was very thorough.

The animals treated included 13 cattle and 5 buffaloes, and 1 animal received 2 gms. less than the correct dose; in all cases the correct dose was carefully calculated from the body-weight, and the amounts given varied from 4·5 to 9 gms. (daily, for 4 days).

During the course of treatment, 3 animals showed diarrhoea, 6 exhibited loss of appetite, and 2 developed a high temperature, but these effects were not severe, and soon disappeared. The lesions found in the liver post-mortem allowed the cases to be classified as follows: 7 slight cases, 3 moderate, 6 moderately severe, and 2 severe.

All but 4 of the animals showed dead Fasciolae in the liver or gall-bladder, the numbers varying from 1 to 21; in 2 cases one partly-degenerated fluke was found, but only one living Fasciola was observed, and this was seen in an animal in which no dead or partly destroyed flukes occurred.

For the whole series of animals, the estimated total number of flukes, before treatment, was 1,347; the total number found after treatment was 78, including 75 dead, 2 partly degenerated, and 1 living fluke.

Seven of the animals showed living *Paramphistomum explanatum*, in some cases numerous, and this species appears to be unaffected by distol.

All of the animals gained in weight, but a similar increase was shown by control cattle, and it was attributed to the liberal diet.

The author considers that distol is an efficient remedy against distomatosis, and that, despite its high price, its use is to be recommended in animals of any considerable value; the elimination of even small numbers of flukes is desirable, as the liver infestation is said to influence unfavourably the course of attacks of trypanosomiasis, piroplasmosis and anaplasmosis, and to retard complete recovery after such attacks.

He recommends treatment twice a year, at the beginning and at the end of the Western monsoon.

In order to check the accuracy of MAREK'S method of estimating the number of flukes present, he submitted 10 untreated cattle to daily faeces examinations for at least 10 days before slaughter, and compared the estimates with the numbers actually found. The method was found, at least under East Indian conditions, to be quite unreliable; for example, in three cattle calculated each to harbour about 25 flukes, the numbers actually found were 2, 57, and 125 respectively.*

MORISHITA (K.). **On Fasciola found in the Dilatation of the Bronchi of Cattle.**—Abstract in *Japan Med. World.* 1925. May 15. Vol. 5. No. 5. p. 129.

"The author obtained a parasite having the form like that of *Fasciola hepatica*, in trachea of cattle. It was found parasitic in that organ and caused dilatation. It occurred not very seldom. By morphological examination it was identified to belong to *Fasciola hepatica*, rather than *Fasciola gigantica*, to which it bore resemblance in some respects."

* Summarized by Dr. W. H. Andrews, M.R.C.V.S.

JOYEUX (Ch.). **Cestodes des poules d'Indochine.** [The Cestodes of Fowls in Indo-China.]—*Ann. Parasit. Hum. et Comp.* 1924. Oct. Vol. 2. No. 4. pp. 314–318. With 3 text figs.

The author has examined a collection of cestodes collected at Hué (Annam). The material was sufficiently well preserved for the diagnosis of the common parasites, but the description of a new species was somewhat difficult.

The following parasites were found :—

Raillietina (Ransomia) echinobothrida,
Raillietina (Ransomia) tetragona,
Hymenolepis carioca,
Cotugnia digonopora,
Hymenolepis bauchei, n. sp.

A detailed description of the last of these is given.

BAER (Jean G.). **Some Cestoda described by Beddard, 1911-1920.** —*Ann. Trop. Med. & Parasit.* 1925. Mar. 31. Vol. 19. No. 1. pp. 1–22. With 15 text figs.

The parasites were found in animals dying at the Zoological Gardens in London, and the specimens examined were those loaned to FUHRMANN, who, owing to pressure of other work, was not able to carry out examinations. They were handed to Baer for scrutiny.

In the author's opinion the following names are synonyms, and must fall. The names which he considers have priority are given :—

Hyracotaenia hyracis Beddard 1912=*Inermicapsifer capensis*= *I. hyracis* (Rudolphi 1810).
Hyracotaenia procaviae=*Inermicapsifer pagenstecheri* (Setti 1897).
Thysanotaenia gambianum=*Inermicapsifer guineensis* (Graham 1908).

According to SKRJABIN :—

Otidiotaenia eupoditis=*Schistometra conoides* (Bloch 1782).

Descriptions are given of *Anoplotaenia dasyuri* Beddard 1911, *Dasyurotaenia robusta* Beddard 1912, and *Thysanotaenia lemuris* Beddard 1911.

HOBMAIER (M.). **Die Entwicklung von** *Ascaris megalocephala* **des Pferdes.** [The Development of *Ascaris megalocephala* of the Horse.]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1925. Vol. 52. No. 2. p. 192–198. With 3 text figs.

The author states that he has been able to follow the migrations of the immature stages of *Ascaris megalocephala* by feeding mice, guinea-pigs, and rabbits with embryonated eggs.

In all these species the embryo leaves the eggs in the anterior part of the small intestine, and they invade the blood or lymph stream from the caecum.

In the case of mice the embryos have disappeared from the intestine on the day after the infecting meal and are to be found in the liver. At the most only an occasional parasite is to be found in the lungs at this stage. After 2 to 4 days they leave the liver and are more readily found in the lungs. By the 6th day the majority of the larvae have reached the lungs. At the end of a week they are discoverable in the mucus of the larynx, and during the course of the second week they can be seen in the mucous membrane of the stomach. In guineapigs

and rabbits the process is similar, but takes a little longer. It is exceptional to be able to trace the migrations as far as the stomach again. The author has only once succeeded in doing so.

The author describes the morphological details of the migrating larvae. The lesions are also dealt with. The passage of the larvae through the intestine and liver as a rule do not cause any obvious symptoms, but a massive invasion of the lungs may actually cause death from suffocation. In such cases there is extensive haemorrhage into the alveoli and small bronchi. The point of penetration of the worms through the bowel wall is marked by a minute haemorrhagic spot. These spots are to be found in the caecum only.

HOBMAIER (M.). **Nematodenknötchen innerer Organe, spez. von *Ascaris megalocephala*, beim Pferde.** [Nodules due to Nematodes in the Internal Organs, and in particular to *Ascaris megalocephala* in the Horse.]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1925. May. Vol. 52. No. 3. pp. 273–278. With 1 text fig.

In the course of their migrations the embryos of *Ascaris megalocephala* produce nodules in the liver and lungs of horses. These have usually been thought to have been produced by *Sclerostome larvae.*

GOODEY (T.). *Oesophagostomum longicaudum* **n. sp. from the Pig in New Guinea.**—*Jl. Helminth.* 1925. Feb. Vol. 3. No. 1. pp. 45–50. With 2 text figs.

Among 114 specimens of Oesophagostomum collected from the large intestine of a cross-bred pig at Raboul, 8 were found which differed from the remaining 106, which were the ordinary *Oesophagostomum dentatum* in that they showed long tails and an enlargement of the oesophagus at the anterior end. A detailed description of the parasites is given.

BAYLIS (H. A.). **On *Gongylonema* collected in Italy during October, 1924, with some Observations on the Genus.**—*Jl. Trop. Med. & Hyg.* 1925. Feb. 2. Vol. 28. No. 3. pp. 71–76.

Worms belonging to the genera Hepaticola and Capillaria were found in rats and fowls respectively in situations which led to the supposition that they might be Gongylonema. Microscopic examination revealed the true nature of the parasites.

G. scutatum was found in sheep, goats, and cattle. Two specimens of gongylonema were found in pigs, but it was found that the pigs examined were fed on cheese factory waste and did not forage for themselves. Baylis is of the opinion that the parasite of the pig cannot be separated from *G. scutatum*, and, further, it is a matter of some doubt as to whether *G. neoplasticum* Fibiger and Ditlevsen should be separated from *G. scutatum.*

BLAIR (K. G.). **Some Notes on the Insect Intermediate Hosts of Gongylonema.**—*Jl. Trop. Med. & Hyg.* 1925. Feb. 2. Vol. 28. No. 3. pp. 76–81. With 7 text figures.

The author briefly reviews the recorded hosts and their habits.

The parasite has been found in the body cavity of many genera of coprophagous beetles, Ateuchus, Chironitis, Onthophagus, Gymno-

pleurus, Geotrupes, Aphodius, and Blaps. Under experimental conditions encysted larvae have been found in the meal worm, and in the musculature of different cockroaches, *Blattella germanica*, *Blatta orientalis*, and *Periplaneta americana*.

HALL (M. C.), SHILLINGER (J. E.) & CRAM (E. B.). **A Test of Raw Onions in the Diet as a Control Measure for Worms in Dogs.**—*Jl. Agric. Res.* 1925. Jan. 15. Vol. 30. No. 2. pp. 155–159.

The authors, after accurate experimental tests, come to the conclusion that raw onions in amounts of 2 ounces daily exercise too small an anthelmintic power to be of any value.

BELPEL (M. J.). **L'Habronemosi cutanea degli equini.** [Habronemiasis of the Skin in Equines.]—*La Clin. Vet.* 1925. Mar. Vol. 48. No. 3. pp. 163–175. With 6 text figs.

The author records the occurrence of this disease in Italy. He is of the opinion that the skin lesions are associated with the presence of the worm in the stomach. He does not hold the view that the infection is spread by contact.

HALL (Maurice C.). **The Occurrence of Cuterebrid Larvae in Dogs and Cats, and the Possible Modes of Infection.**—*Jl. Econ. Entomol.* 1925. Apr. Vol. 18. No. 2. pp. 331–334.

Cuterebrids of the genera Cuterebra, Bogeria, Rogenhofera, and Atrypoderma are normally parasitic in Rodentia and Lagomorpha, but evidence is accumulating that their occurrence in carnivora is not so rare as has been thought. The author summarizes the records of cases hitherto published.

Possible methods of infection are the eating of infected rodents and direct oviposition. Prenatal infection must also be borne in mind.

FRISON (Theodore H.). **Intestinal Myasis and the Common House-Fly (*Musca domestica* Linn.).**—*Jl. Econ. Entomol.* 1925. Apr. Vol. 18. No. 2. pp. 334–335.

A case of intestinal myiasis due to *Musca domestica* in a boy 16 years old is recorded.

In a discussion which followed it was stated that scores of cases of myiasis have been established by examination of larvae at Washington during the last 10 or 12 years.

ROBERTS (J. Isgaer). **On the Bionomics of *Hippobosca equina*.**—*Ann. Trop. Med. & Parasit.* 1925. Mar. 31. Vol. 19. No. 1. pp. 81–90.

The fly has a limited distribution in North Wales, and is restricted to certain valleys in Carnarvonshire and Merionethshire. The distribution is governed by the presence of bracken, which is necessary for pupation, and the amount of sunshine. Horses and cattle are the chief hosts, but dogs are attacked.

Serious consequences may be caused by it frightening animals not accustomed to it. The diminution of horse transport has led to the fly attacking cattle. It was found impossible to keep the fly alive in the laboratory and conduct breeding experiments. It is generally found from May to August.

Decaying humus below bracken is the normal habitat for the deposition of larvae.

ANDERSON (Ch.). **Présence de *Bullinus contortus* dans l'oasis de Biskra (Algérie).** [The Presence of *Bullinus contortus* in the Oasis at Biskra (Algeria).]—*Bull. Soc. Path. Exot.* 1925. Mar. Vol. 18. No. 3. pp. 267–268.

BRUMPT (E.). **Particularités évolutives de l'*Amblyomma agamum*.** [Details of the Evolution of *Amblyomma agamum*.]—*Ann. Parasit. Hum. et Comp.* 1924. Apr. Vol. 2. No. 2. pp. 113–120. With 3 text figs.

CAMERON (Thomas W. M.). **The Cestode Genus *Mesocestoides* Vaillant.**—*Jl. Helminth.* 1925. Feb. 1. Vol. 3. No. 1. pp. 33–44. With 16 text figs.

CRAM (E. B.). **A New Nematode, *Cylindropharynx ornata*, from the Zebra, with Keys to the Related Nematode Parasites of the Equidae.**—*Jl. Agric. Res.* 1924. May 17. Vol. 28. No. 7. pp. 661–672. With 8 text figs.

GOODEY (T.). **Observations on Certain Conditions requisite for Skin Penetration by Infective Larvae of Strongyloides and Ankylostomes.**—*Jl. Helminth.* 1925. May. Vol. 3. No. 2. pp. 51–62.

LEWIS (E. Aneurin). **Starlings as Distributors of "Gapes."**—*Jl. Helminth.* 1925. Vol. 3. No. 2. pp. 81–82.

ORTLEPP (R. J.). **Observations on the Life History of *Triodontophorus tenuicollis*, a Nematode Parasite of the Horse.**—*Jl. Helminth.* 1925. Feb. Vol. 3. No. 1. pp. 1–14. With 9 text figs.

THAPAR (G. S.). **On the Morphology and Systematic Position of *Echinopharynx*, a new Genus of Bursate Nematode from *Testudo tabulata*.**—*Jl. Helminth.* 1925. Feb. 1. Vol. 3. No. 1. pp. 19–32. With 10 text figs.

THAPAR (G. S.). **On Some New Members of the Genus *Kiluluma* from the African Rhinoceros.**—*Jl. Helminth.* 1925. May. Vol. 3. No. 2. pp. 63–80. With 32 text figs.

TURNER (W. Y.). **The Morphology of *Filaria sagitta* v. Linstow, 1907, from the Heart of *Tragelaphus sylvaticus* in Nyasaland.**—*Jl. Helminth.* 1925. Feb. Vol. 3. No. 1. pp. 15–18. With 6 text figs.

BACTERIAL DISEASES.

SACHELARIE (V.). **Etude comparative sur l'immunité conférée par la vaccination anticharbonneuse pratiquée par inoculation dans la peau et par la vaccination pasteurienne classique, chez les bovines.** [Intradermal and Subcutaneous Vaccination of Cattle against Anthrax.]—*Rev. Gen. Méd. Vét.* 1925. May 15. Vol. 34. No. 401. pp. 230–240.

It has been shown by BESREDKA and others that rabbits and guineapigs are resistant to infection with anthrax by any path other than the skin. The domesticated animals, on the other hand, are susceptible to infection by all paths. This is a point of considerable importance.

While guineapigs are susceptible to infection practically only by way of the skin, they can be immunized with certainty by the same path. The serum of such guineapigs has no protective power, and the conclusion is drawn by BESREDKA that the immunity possessed by such vaccinated guineapigs is due to the local immunization of the

skin and the natural power of resistance possessed by the other organs. On the other hand, the immunity conferred upon cattle and other large animals by the usual methods is one involving all the tissues, and this rests upon the production of antibodies, the existence of which in the serum is demonstrable.

The author briefly reviews the experiments of BROCQ-ROUSSEU and URBAIN, MAZUCCHI, and VELU regarding immunization via the intradermal route. These authors have, however, in testing their animals, given the test doses by the same path. This may merely test the local immunity conferred upon the skin. The important point to determine is whether the immunity acquired is general.

Quite recently intradermal vaccination has been practised on a vast scale in the Levant army, it having been found necessary to abandon the Pasteur method and sero-vaccination. In all, 10,000 animals were treated, and it will be necessary to wait a year before the results can be evaluated. It must suffice for the present to say that the experiment was carried out in an infected area under the best possible conditions.

The author's experiments have been designed to provide answers to the following questions :—

1. The comparative resistance of cattle immunized intradermally and subcutaneously with Pasteur vaccines to experimental and natural infection.
2. The protective powers of the sera of such animals.
3. What conclusions may be drawn regarding the method of vaccination to be employed in a country where infection is likely to be heavy and the organism very virulent.

For his experiments Sachelarie had available 9 heifers of approximately the same age and size. Five of these were vaccinated intradermally with first and second vaccines at an interval of 8 days. The remaining 4 were vaccinated subcutaneously by the Pasteur method.

For the inoculations the anal fold was selected, for the reasons that it does not require shaving, it is convenient, and it can readily be kept steady while the injections are made, and comparisons are easily made.

In animals vaccinated intradermally a local reaction occurs in the form of a small slightly painful swelling which persists for several days. There is also a slight oscillation of temperature. This reaction is more distinct than that shown by animals inoculated subcutaneously. A month after the vaccinations were completed test inoculations were begun.

In the first test two of each of the batches and two control heifers were inoculated intradermally with a virulent strain of anthrax of Roumanian origin. The following day the animals vaccinated intradermally showed no symptoms of any kind. In those vaccinated subcutaneously there was a rise of temperature to 39·5° C. and a painful oedematous swelling at the seat of inoculation. The control animals were seriously ill, and during the next few days they showed temperatures exceeding 41° C., and there was pronounced and painful swelling of the fold of skin. These symptoms persisted for three or four days, and then recovery took place. The animals lost condition very markedly.

From this experiment it would appear that intradermal inoculation afforded the greater amount of protection.

In the second test one heifer of each batch was inoculated, the

intradermal path being again selected, but 0·5 cc. of culture was used, instead of 0·25 cc. used in the first test. No control was inoculated. Again, the animal inoculated intradermally gave no reaction, while that inoculated subcutaneously showed a painful swelling and a rise of temperature.

In the third test, two vaccinated animals, one from each batch, and an unvaccinated control. These animals were fed with oats mixed with powdered glass and a quantity of sporulating anthrax culture. The test was therefore a very severe one. The control animal died of anthrax, but neither of the vaccinated animals showed the least sign of ill-health.

Fourth test. A heifer vaccinated intradermally was fed as in the previous test, but the amount of sporulating culture added was very much greater. The test resulted in a rise of temperature to a maximum of 40·6° C., and there was great prostration. Recovery followed, but there can be no doubt that this would not have taken place had the animal not been vaccinated.

The serum of this animal, taken on the day of the test, protected a guineapig against a fatal dose of anthrax in an amount of 2 cc.

It appears to be clear then that intradermal vaccination produces both local and general immunity.

Tests were carried out with the sera of all the heifers on guineapigs, and it was found that while doses of 1 cc. failed to confer immunity against the second vaccine, 1½ and 2 cc. conferred immunity. The sera of heifers after vaccination only and before test inoculations were found to be protective for guineapigs, and therefore it appears to be certain that intradermal vaccination establishes general immunity.

MONOD (T.) & VELU. **Intradermovaccination en un temps contre le charbon bacteridien.** [Single Intradermal Vaccination against Anthrax.]—*Rec. Méd. Vét.* 1925. Feb. Vol. 101. No. 4. pp. 67–73.

During 1924, 40,000 single doses of sporulated vaccine were used in Morocco, and of these nearly half have been administered intradermally. In some districts the vaccine has been employed although no cases of anthrax were reported. In others it has been used after the use of protective serum which was employed for the control of outbreaks. In other places it has been used as a prophylactic and as a means of checking the disease after it had appeared.

Objection has been raised to the technique of injecting into the anal folds on the score of risk from kicks, and the skin behind the shoulder has been suggested as an alternative, but it must be pointed out that this seat of injection is open to the very serious objection that if the vaccine is by chance implanted through the skin serious results are likely to follow. Intradermic vaccination is not followed by any reaction.

Only in one case was the intradermal vaccination followed by ill effects. One veterinary surgeon reported loss of appetite, dullness and depression, followed by the appearance of piroplasmosis in some cattle and sheep. The appearance of the latter is not a matter for surprise, as it has been recorded on many occasions, but it is difficult to explain the general symptoms since the animals upon which the vaccine tests were carried out tolerated 1,000 doses without any reaction of this kind.

Serious losses were reported by one owner (7 out of 35), but the diagnosis was made by the owner and was based on splenic enlargement. The authors insist upon the difficulty of making a definite diagnosis in this way in a country where piroplasmosis exists, and where this disease is a greater danger than anthrax for cross-bred animals.

In testing the immunity two sheep which were in poor condition and which had been vaccinated intradermally eight months previously were injected with 1,000 m.l.d. of the Moroccan strain of anthrax. One died of anthrax and one of shock. It is pointed out that the test was immensely more severe than natural infection.

VELU (H.) & BIGOT (A.). **Vaccination du cheval contre le charbon bacteridien per intradermovaccination en un temps.** [The Protection of Horses against Anthrax by a Single Intradermal Vaccination.]—*Rec. Méd. Vét.* 1925. Jan. 30. Vol. 101. No. 2. pp. 40–49.

The authors have vaccinated experimentally 59 animals (horses and mules). They have used a sporulated vaccine which was of slightly lower virulence than that used in Morocco for the protection of oxen, sheep and pigs. The dose used was 0·25 cc. injected at one place.

After some experience the injection of the vaccine into the skin beneath the tail or the skin of the ear was abandoned, the former because restraint of the animals was difficult, and the latter because of the production of a painful swelling.

Finally, the skin of the neck was selected. If by accident the vaccine is introduced subcutaneously the only results are that there is a delay in the establishment of immunity and there is a more or less extensive local reaction. The authors give details of each animal treated in a tabular statement. Of the 59 animals treated, 38 showed no reaction. There was no general reaction in any case save one, and in this animal wasting was observed. Four animals showed elevations of temperature.

Test inoculations were carried out from 5 to 28 days after the vaccination, and these were given subcutaneously. Forty-eight animals showed no reaction. Of the remaining 11, 8 developed a slight temporary local swelling and the others a more persistent swelling, which disappeared slowly. One of these died of anthrax on the fourth day. In this particular case the whole of the vaccine was not introduced into the skin. The authors believe that the animal would have resisted natural infection.

WIGOTSCHIKOFF (G.). **Die Hautvakzination gegen Milzbrand.** [Skin Vaccination against Anthrax.]—*Zeitsch. f. Immunitätsforsch.* 1925. Feb. 16. Vol. 42. No. 2. pp. 105–112.

Five guineapigs were treated by applying ZENKOVSKY'S vaccine to a shaved area of skin with a tampon. The vaccine contained vegetative forms only.

No protection was conferred.

The author thought that possibly the immunization was not complete because of the impossibility of making certain that the full dose of vaccine was used. He therefore treated five further guineapigs by injecting 0·1 cc. of the first and second ZENKOVSKY'S vaccines intradermally. One dose of the first was given and four doses of the second.

The latter were 0·1, 0·1, 0·2, and 0·3 cc. respectively, and were given at weekly intervals. Subcutaneous injection of 0·1 cc. of virus proved fatal.

A second series of experiments was carried out with rabbits. Ten were used, but in only two was a degree of resistance to infection found.

In further experiments it was found to be possible to infect rabbits without involving the skin in the operation. The insusceptibility of the internal organs is only relative, and dependent upon the dose of infective material used.

CORDIER (G.). **Essais de cuti-vaccinations contre la fièvre charbonneuse. Résultats comparatifs de différentes méthodes.** [Cuti-Vaccination against Anthrax.]—*C.R. Soc. Biol.* 1925. May 15. Vol. 92. No. 16. pp. 1309–1311.

Guineapigs had first and second anthrax vaccines applied to shaved areas of skin for 24 hours each at an interval of 12 days. When tested 24 days after the second vaccine by virulent culture placed on the skin for 24 hours, two-thirds of the animals succumbed. The actual numbers are not given. Sixteen days later the survivors received one-tenth cc. of the same virulent culture. All died.

In the second series of tests the vaccines were applied with friction for 5 minutes. The intervals were the same as in the first tests. When tested with virulent material, also applied with friction, three-fifths of the animals died. A second test 16 days later by the subcutaneous path failed to infect any of the survivors.

Intradermo inoculations.—The doses were 0·1 cc. of vaccines injected intradermally at an interval of 12 days. Intradermal test inoculations carried out later caused death in 12 out of 14. A second test killed 1 of the 2 survivors.

Three sheep were vaccinated by friction, and when tested with virulent culture applied in the same way one died. The two survivors failed to become infected by a second test inoculation.

Fifteen sheep were vaccinated intradermally. Fourteen of these survived a test inoculation, and one of these survivors died after a second test inoculation.

Three calves were protected by intradermal inoculation, and two of these showed only a rise of temperature when subjected to a test inoculation.

Two sheep were vaccinated by injection into bone marrow. Both survived intradermic and subcutaneous test inoculations.

A similar result followed vaccination into the testicular substance, care being taken to avoid contamination of the tunics of the organ.

In many cases fixation tests were carried out after the second vaccines, but no positive results were obtained.

NICOLAS (Eug.). **Intradermo-vaccination, contre le charbon bactéridien de 8,912 chevaux et mulets de l'armée du Levant.** [Intradermo Vaccination against Anthrax of 8,912 Horses and Mules of the Levant Army.]—*C.R. Soc. Biol.* 1925. Mar. 13. Vol. 92. No. 9. pp. 693–694.

The technique was as follows: The animals were first injected in three places 5 centimetres apart on the side of the neck with 0·25 cc. of first vaccine (Pasteur). They were rested on the following day.

From the third to the sixth day they did their normal work. On the seventh day the second (Pasteur) vaccine was given in the same manner on the opposite side of the neck. After a day's rest they were put to work again.

No ill-effects followed the first vaccine. In 22 per cent. there was a certain amount of swelling after the second vaccine was given. This appeared in from 2 to 53 days after the operation, but usually during the second week. These swellings were in most cases reabsorbed without treatment or after a dose of anti-anthrax serum. In four cases swellings occurred in parts of the body remote from the seat of inoculation, and two of these animals died.

A year later four cases of anthrax had occurred among the vaccinated animals, and two of these terminated fatally.

During the period 1919-1923, when subcutaneous injections of serum were given, and only in infected places, the mortality averaged 0·81 per cent. per annum.

In 1924, when the intradermo-vaccination was used, the mortality was 0·045 per cent.

SANARELLI (G.). **Sur la pathogénie du charbon dit "Interne" ou "Spontané."** [The Pathogenesis of so-called "Internal" or "Spontaneous" Anthrax.]—*Ann. Inst. Pasteur.* 1925. Mar. Vol. 39. No. 3. pp. 209–297.

This long paper is divided into sections dealing with the following points: (1) A review of the opinions at present held regarding the pathogenesis of "internal" anthrax; (2) The impossibility of reproducing experimentally the so-called "intestinal anthrax mycosis"; (3) the behaviour of anthrax bacilli in the alimentary tract; (4) the non-existence of the condition termed "intestinal anthrax mycosis"; (5) the manner in which anthrax spores behave in the lungs of animals; (6) the manner in which intestinal anthrax develops in animals infected with spores; (7) the production of the lesions in internal anthrax.

It is an opinion generally held that the so-called intestinal anthrax is due to the germination of spores, which have escaped the action of the gastric juice, in the intestine, and that the serious lesions are due to direct invasion of these parts by the bacilli.

So far all experiments designed to reproduce "natural anthrax" by experimental means have failed to yield convincing results.

Sanarelli's experiments, which are described in this paper, and which have been carried out with newly born and adult guineapigs and rabbits, indicate that it is almost impossible to induce infection in this way even with enormous doses. The bacilli are promptly destroyed by the gastric juice and by the intestinal secretions. In the great majority of cases similar results follow the administration of spores by the mouth. In some of these cases, however, death from anthrax occurred, and in these animals there were usually local lesions indicating that the infection had actually taken place by inoculation. There were, however, some cases in which no evidence of such localized infection was found.

The administration of spores by the mouth showed that they are not destroyed by the gastric juice, and, further, that they are incapable of germinating in the intestine. The intestinal secretions exercise anti-bacterial powers particularly when fresh, but even when old, or after subjection to heat, they inhibit multiplication.

The introduction of large quantities (100,000) of spores into the respiratory tract is followed by infection, but smaller doses, such as are capable of being dealt with by the local defences, fail to cause the disease. The spores are transported by the blood to various organs and remain there without producing any effect, and by degrees they are digested. In cases of this kind fatal infection can be caused by injecting some substance which will cause the formation of necrotic foci, or will disturb the physico-chemical relationships of the cell colloids. Substances which have been found capable of producing these effects are arsenic, quinine, lactic acid, sodium nucleinate, glucose, peptone, blood, milk, distilled water, and living and dead cultures of colon bacilli.

Pulmonary anthrax can be produced in this way, the chemical substance being injected into the air passages either immediately after, or some days after the injection of the spores. The exposure of animals that are " carriers " of spores, to adverse conditions, such as incubation at body temperature on a number of occasions, leads to reduction of cell resistance and infection. A similar result may be obtained by keeping such rabbits short of water (*i.e.*, feeding them with food which is deficient in water). Such a diet is fatal to normal rabbits in about 6 weeks, but " carrier " rabbits die in a week.

The lesions of the alimentary canal found in anthrax are not those of local infection, but result from blood invasion.

CORDIER (G.). **Sur la teneur en glucose du sang des animaux charbonneux. Action de l'insuline et du sérum glucosé dans l'évolution de l'infection charbonneuse.** [The Glucose Content of the Blood of Animals infected with Anthrax. The Effects of Insulin and Serum containing Glucose upon the Development of Anthrax.] *C.R. Soc. Biol.* 1925. May 15. Vol. 92. No. 16. pp. 1307–1308.

The amount of glucose in the blood of animals affected with anthrax is so variable that no accelerating or retarding action can be ascribed to insulin or glucose serum in the evolution of the disease.

BASSET (J.). **Réceptivité du cobaye et du lapin au virus du charbon bactéridien.** [The Susceptibility of the Guineapig and the Rabbit to Anthrax.]—*C.R. Soc. Biol.* 1925. June 5. Vol. 92. No. 19. pp. 1513–1515.

The author is of the opinion that BESREDKA'S view regarding the susceptibility of the skin to anthrax, to the exclusion of other tissues, is too sweeping. He cites a few experiments designed to show that it is the subcutaneous tissue which is the most susceptible to infection. In his opinion the epidermis is really the only tissue which belongs to the skin proper. This has a low degree of susceptibility to anthrax.

BASSET (J.). **Pouvoir pathogène des spores pures de la bactéridie de Davaine.** [The Pathogenicity of Pure Spores of Davaine's Bacillus.]—*C.R. Soc. Biol.* 1925. June 5. Vol. 92. No. 19. pp 1515–1517.

A brief description is given of inoculation experiments designed to show that the spores of the bacillus of anthrax are less pathogenic than the vegetative elements.

BASSET (J.). **Spores pures de la bactéridie de Davaine dans les tissus lésés. Associations microbiennes.** [Pure Spores of the Anthrax Bacillus in Damaged Tissues. Bacterial Associations.]—*C.R. Soc. Biol.* 1925. June 5. Vol. 92. No. 19. pp. 1517–1519.

While the injection of anthrax spores in a state of purity is not necessarily fatal, the admixture of lactic acid renders a non-pathogenic dose pathogenic. The facts, according to the author, run parallel with those regarding *B. chauvaei.*

LECLAINCHE (E.) & VALLÉE (H.). **Sur la vaccination contre le charbon symptomatique.** [Vaccination against Blackquarter.]—*C.R. Soc. Biol.* 1925. May 15. Vol. 92. No. 16. pp. 1273–1276.

The authors claim that the addition of 2 to 4 per 1,000 of "formol" to cultures kept at 38° C. yields sterile antigens which are far more active than filtered cultures.

Young cultures to which "formol" has been added become avirulent and non-toxic. Thus, one obtains a vaccine which resembles the non-toxic diphtheria vaccine.

Whole cultures so treated may be injected subcutaneously into guineapigs and bovines in doses of 0·5 to 5 cc. without any effect other than a slight œdema. When tested at intervals of 10 to 30 days these animals withstand several lethal doses of the same culture in its virulent state.

Experiments on a large scale are under way, and from these it is hoped to obtain information regarding the duration of the immunity.

WAGENER (K.). **Die Diagnose des Rauschbrandes.** [The Diagnosis of Blackquarter.]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1925. April 1. Vol. 52. No. 2. pp. 73–179.

In this paper the author deals at length with the following points in connection with Blackquarter: Epidemiology, the animals susceptible to infection, symptoms, pathological anatomy, bacteriology, nomenclature, and the importance of diagnosis. The section dealing with the bacteriology of the disease is further divided into sections dealing with the morphology of the organism, experimental inoculations, serum diagnosis, and culture experiments.

The paper contains four text figures and concludes with a very extensive list of references.

ZANOLLI (C.) & SORDELLI (A.). **Identidad del Carbunclo sintomático y de "La Mancha."** [The Identity of Blackquarter with "La Mancha."]—*Revist. Med. Vet.* 1925 [Dec. 1824–Mar. 1925]. Vol. 7. Nos. 5 & 6. pp. 372–380.

1. The age of the animals attacked does not furnish any evidence that the two diseases are distinct.
2. The morpholoical and cultural characters of the causal organisms of the two diseases are identical.
3. The lesions produced in both guineapigs and sheep by inoculation with the two organisms are the same.
4. The organisms cannot be distinguished by serological tests or by neutralization of toxin tests.

SMITH (Theobald). **Pneumonia associated with *Bacillus abortus* (Bang) in Fetuses and New-born Calves.**—*Jl. Exp. Med.* 1925. May 1. Vol. 41. No. 5. pp. 639–647. With 2 plates.

Pneumonia of varying extent due to *B. abortus* may be present in calves. In some cases the pneumonia is established early, in others the pneumonia is found in calves which have survived for a few hours only, and in calves which have survived for a week or more.

The bacillus has been isolated directly or via the guineapig, or in both ways from many cases.

BEVAN (L. E. W.). **Infectious Abortion of Cattle. Notes on Agglutination.**—*Veter. Jl.* 1925. Mar. Vol. 81. No. 3. pp. 110–126.

Experiments with "devitalised" vaccines for the purpose of immunization have led to inconclusive results.

DUNCAN (J. T.). **The Rôle of the Domestic Cow in the Epidemiology of Undulant Fever.**—*Trans. Roy. Soc. Trop. Med. & Hyg.*—1924. Nov. 20 & Dec. 11. Vol. 18. Nos. 5 & 6. pp. 318–327.

In this paper the author records a case of undulant fever in an Englishman from Rhodesia which was apparently caused by *B. abortus*. This view was supported by agglutination tests and by absorption tests. Culturally the organism also tended to resemble *B. abortus* more closely than *B. melitensis*.

GERLACH (F.) & MICHALKA (J.). **Über die häemorrhagische Septikämie der Schafe.** [Haemorrhagic Septicaemia in Sheep.].—*Zeitschr. f. Infektionskrankh. parasit. Krankh. u. Hyg. d. Haust.* 1925. Feb. 3. Vol. 27. No. 4. pp. 276–287.

The authors record what they believe to be the first cases of haemorrhagic septicaemia in sheep in Austria.

Only a few cases were observed. The principal lesions were serofibrinous pleurisy and broncho-pneumonia with necrosis. As was to be expected, a mixture of bacteria was found in the exudate and in the lung tissue, but a bipolar organism was found in a state of apparent purity in the bronchial glands.

The organism was pathogenic for mice and rabbits, but not for guineapigs. Intratracheal injection into a sheep produced dullness, a nasal discharge, and bronchial râles. A second intratracheal injection given ten days later caused the reappearance of symptoms. At the postmortem examination two abscesses were found at approximately the seats of injection, it being apparent that the entire doses had not been introduced into the trachea. The blood, lungs, bronchial glands, etc., were sterile, but a bipolar organism was cultivated from the abscesses in the neck. The organism was pathogenic for mice, and one of two pigeons inoculated died. The other pigeon and a fowl, although they showed evidence of illness, recovered. Subcutaneous inoculation of a lamb caused visible illness. There was a rise of temperature and acceleration of pulse and respiration, marked catarrh of the nasal mucous membrane, and muscular spasms. Death took place in 36 hours. At the postmortem there was sero-haemorrhagic

infiltration at the seat of inoculation, nasal catarrh, congestion of the meninges of the brain, petechiae on the pleura, epicardium and in the kidneys.

An antiserum was prepared from a horse, and by the use of this, coupled with thorough disinfection, deaths among the sheep were stopped.

NIIMI (D.). **Correlations between Haemorrhagic Septicaemia Organisms.** *Jl. Jap. Soc. Vet. Sci.* 1924. Dec. Vol. 3. No. 4. pp. 309–310. [Author's English abstract.]

The author has been unable to distinguish between *B. bubalisepticus*, *B. suisepticus*, *B. avisepticus*, and *B. bovisepticus* by morphological, cultural, or serological tests, nor has he been able to show any differences in their pathogenicity.

CAROUGEAU. **Lymphangite ulcéreuse à Madagascar.** [Ulcerative Lymphangitis in Madagascar.].—*Rev. Gen. Méd. Vét.* 1925. Jan. 15. Vol. 34. No. 397. pp. 8–9.

In this brief note the author states that no confusion has been made between ulcerative lymphangitis and bursati in Madagascar. The latter disease, so far as he knows, does not exist there, but he has known of the existence of ulcerative lymphangitis in the Island for nearly twenty years. He has differentiated the disease from sporotrichosis and from epizootic lymphangitis. The latter disease is not now known in Madagascar ; no cases have been seen since the importation of mules from Algeria was stopped.

A cure can be effected provided intervention is early. The best results have been obtained by intravenous injection of arsenobenzol or novarsenobenzol. Three or four injections, each of 3 grammes, are given at intervals of eight days. Secondly, favourable results have followed the subcutaneous injection of 50 to 60 cc. of blood taken from the animal itself every four or five days. Intravenous injections of 1–2 cc. of oil of turpentine every four days have been found useful.

All external treatments suitable to such cases must be applied at the same time.

EMOTO (O.) & NIIMI (D.) **Infectious Pneumonia in Sheep.**—*Jl. Jap. Soc. Vet. Sci.* 1924. Dec. Vol. 3. No. 4. pp. 345–346. [Author's English Abstract.]

Infectious pneumonia has been the cause of heavy losses among sheep every summer. At the postmortem examinations severe infestations with worms were found in the stomach and intestines. There was catarrhal pneumonia associated with pleurisy.

From the diseased lungs *Bacillus pyogenes*, *B. avisepticus*, a small Gram-positive bacillus, *Micrococcus catarrhalis*, a streptococcus, and a staphylococcus were isolated. The first three of these were considered to be of the greatest importance on account of their frequent occurrence, their virulence for lambs and laboratory animals and the serological reactions given with the serum of diseased lambs.

A mixed vaccine was prepared and used on the infected farm. Vermifuges were prescribed at the same time. The losses were reduced to one-tenth the number of previous years.

LIGNIÈRES (J.). **Sur la classification du microbe de la typhose aviaire.** [The Classification of Fowl Typhoid.]—*Bull. Acad. Méd.* 1925. May 5. Vol. 93. No. 18. pp. 500–505.

Lignières has had the opportunity of comparing the organism isolated in the Argentine (*Salmonella avium*) with *B. sanguinarium*—the cause of fowl typhoid in France—and concludes that they are identical.

SABELLA (A.). **Involuticnsformen des** *Bacillus erysipelatos suis.* [Involution Forms of the Bacillus of Swine Erysipelas.]—*Centralbl. f. Bakt.* I. Abt. Orig. 1925. May 1. Vol. 94. No. 7–8. pp. 411–416. With 3 text figs.

The presence of Saponin in culture media used for the cultivation of the swine erysipelas bacillus leads to the production of involution forms. Bacilli so cultivated differ morphologically, culturally, and serologically from the original form, and these new characters may be impressed upon them.

TEPPAZ (L.). **Tuberculoses animales en A. O. F.** [Tuberculosis of Animals in French West Africa.]—*Rev. Méd. de Angola.* 1923. Aug. (No. especial consagrado ao 1º Congresso de Med. Trop. da Africa Ocidental. Vol. 5.) No. 4. pp. 219-220.

Tuberculosis is rare among animals in French West Africa, but it is not correct to state, as has been done, that it does not occur.

The author summarizes briefly the reports previously published regarding the existence of the disease.

Teppaz has found 6 cases in three years at an abbatoir killing 20 to 30 bovines daily.

During 1923, although every suspicious lesion was subjected to biological examination, only a single positive result was obtained. Zebus must be considered as resistant to infection with tuberculosis.

Pigs appear to be resistant also. In all, 6 cases have been recorded, but the type of bacillus responsible has not been ascertained. No cases have been recorded in cats or dogs.

MYCOTIC DISEASES.

MICHELON. **Un cas d'abcès pulmonaire determiné par des Cryptocoques.** [A Pulmonary Abscess due to Cryptococci.]—*Rec. Méd. Vét.* 1925. Feb. 15. Vol. 101. No. 3. pp. 71–72.

The horse was under treatment for epizootic lymphangitis from July 11th to September 13th, 1924. It showed four abscesses on the lower lip, and abscess formation in the sublingual glands. A mallein test yielded a negative result. Under treatment the lesions cleared up. About a month later the horse was slaughtered on account of a fracture of the humerus. At the postmortem a small abscess was found in the apex of the right lung. The glands were enlarged but otherwise normal in appearance. On section a small quantity of yellowish white pus escaped. Close examination shewed that in reality there were three

or four abscesses close together. Microscopic examination revealed the presence of cryptococci in a state of purity. A minute abscess was discovered in one of the bronchial glands, and in this cryptococci were found.

The other organs were apparently normal.

GRONOW (A.). **Kultur- und Infektionsversuche mit dem** *Cryptococcus farciminosus.* [Cultural and Infection Experiments with the *Cryptococcus farciminosus.*]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1924. Dec. 30. Vol. 51. No. 6. pp. 601–615.

The greater part of this paper is occupied by a general survey of the state of knowledge regarding epizootic lymphangitis.

The organism was cultivated in two liquid media containing ox and horse serum respectively.

The medium had the following composition :—Ox serum 70, beef broth 30, grape sugar 2, and glycerin 2. It is not stated at what temperature the cultures were incubated. Growth began to appear in about a fortnight, on the surface of the medium and as a sediment. In the course of three weeks the surface was covered with a bluish-white growth. A horse inoculated cutaneously with culture developed an abscess at the seat of inoculation. Reference is made to cultures obtained on an agar medium, but the composition of this is not specified. Growth from solid cultures was also used for the inoculation of this horse at another part of the body. An abscess developed. Mycelial and yeast forms were found in the pus. No infection followed intraperitoneal inoculation.

Attempts to obtain evidence of infection by the complement fixation test using various extracts as antigen failed.

KÄMPER. **Die Lymphangitis epizootica des Pferdes.** [Epizootic Lymphangitis.]—*Arch. f. Wissenschaft. u. Prakt. Teirheilk.* 1924. Dec. 30. Vol. 51. No. 6. pp. 616–641.

This paper contains an account of the various methods of treatment which have been tried by the writer.

Seventy-five animals have been under his observation. Of these 19 died or were killed. Of the 56 which recovered 30 recovered without treatment. Eighteen were cured by operation, and one by curetting. Seven, or 37 per cent., of the animals treated by medicinal means recovered.

The author's observations lead him to think that the cryptococcus may persist for months in encapsuled abscesses. Outside the body they may retain their vitality for 6 months.

BIGOT (A.) & VELU (H.). **Isolement rapide de** *Cryptococcus mirandei* **en culture pure.** [The Rapid Isolation of *Cryptococcus mirandei.*]—*Bull. Soc. Path. Exot.* 1925. Feb. 11. Vol. 18. No. 2. pp. 127–129.

The methods used have been based upon those devised by PIELTRE and DE SOUZA for soil investigations, and by BAROTTE and Velu for the cultivation of the cryptococcus of RIVOLTA. The principle of the method is the use of media acidified with citric acid to the extent of 5 per mille.

A fragment of a tumour from a donkey's eye placed on Sabouraud's agar acidified in this method and incubated at 32° C. appears swollen after 24 hours, acquires a creamy white tint, and is surrounded by a greyish margin.

A subculture on ordinary or acidified Sabouraud yields an abundant pure culture in 24 hours.

The acidified medium was found to prevent the multiplication of accidental organisms.

No growth was obtained in acidified peptone broth, and subcultures on Sabouraud's agar after 24 or 48 hours also failed to grow. Acidified peptone broth appears therefore to have a sterilizing action.

JEAUME (G.) & DEKESTER (M.). **Isolement de l'agent pathogène de la Blastomycose des voies lacrymales.** [The Isolation of the Cause of Blastomycosis of the Lachrymal Tract.]—*Bull. Soc. Path. Exot.* 1925. Feb. 11. Vol. 18. No. 2. pp. 125–127. With 8 text figs.

Cultures of the organism can be obtained upon Sabouraud's medium and on dung agar, and on many of the ordinary media. The optimum temperature appears to be about 30° C., and at this temperature visible growth is obtained within 24 hours. On agar media the organism forms a continuous glistening layer which is readily detached. As cultures become older they turn brown, become dry and wrinkled. In peptone broth there is first formed a flocculent deposit at the bottom, then a ring of growth forms round the surface of the medium, and this finally becomes covered with a surface growth.

The organism possesses great vitality, and subcultures can be obtained from tubes which have been left in the laboratory without special precautions for a year or more. The organism appears as a rounded or oval body which may be drawn out at one end, and may or may not show a refractile granule.

Multiplication in broth is by budding, and actual chains may be formed. Some of the organisms become elongated, but true filaments have not been observed.

On agar the cells rapidly increase in volume and may measure 7–8μ. The wall becomes thickened and the refractile granules increase in number.

On carrot multiplication comes to a stop rapidly.

On two occasions the authors have been able to produce lesions in donkeys experimentally with cultures. The organism is provisionally placed in the genus Cryptococcus.

DISEASES DUE TO FILTERABLE VIRUSES.

REPETTO (R.). **Quelques cas de rage canine au Bas-Congo.** [Canine Rabies in the Lower Congo.]—*Rev. Méd. de Angola.* 1923. Aug. (No. especial consagrado ao 1° Congresso de Med. Trop. da Africa Ocidental. Vol. 5.) No. 4. pp. 113–114.

An outbreak of what appeared to be rabies occurred at Mayumbe in June, 1922. Diagnosis was based upon clinical evidence, as means were not available for biological or histological examinations. It appeared to be probable that the outbreak was an extension from that which had occurred earlier at Brazzaville.

In October cases occurred at Boma. In these cases detailed examinations were made. Typical Negri bodies were discovered in the brains of two cases.

Animals inoculated subdurally from the first case died, probably because the material used was putrid, on the following day. Two rabbits inoculated subdurally from the second case also died on the day following the operation. Two guineapigs and two rats inoculated subcutaneously survived. Two dogs inoculated with brain tissue kept in glycerin for 13 days also survived.

A specimen of fixed virus from the Antirabic Institute at Sassari was used for the inoculation of two dogs subdurally, and to guineapigs and two rats subcutaneously. None of these became infected. This virus had been obtained from Europe 2 months previously and was considered to be exceedingly virulent.

REMLINGER (P.). **Vaccination du chien et du chat contre la rage au moyen du virus-éther.** [The Vaccination of Dogs and Cats against Rabies by means of Virus treated with Ether.]—*C.R. Soc. Biol.* 1925. May 8. Vol. 92. No. 15. pp. 1195–1196.

The experiments have been carried out with the brains of rabbits, the spinal cords of which are used for human protective inoculations. The brains are immersed in ether for 25, 20, and 15 hours. They are then emulsified with 50 cc. of sterile salt solution and filtered through muslin. The injections are made subcutaneously every day or every other day. A whole brain is used at each injection for a dog, and half for a cat. It is not held that either the periods of immersion or the doses are definitive.

Brains may be kept in glycerin until they are required, and may be then immersed in ether, and etherized brains may be placed in glycerin for transmission to places where they are required.

Further experiments are under way in which the brains of rabid dogs are being tested as vaccine in this way, and a further account of the results is promised.

GUYON (M.). **Curieux effets de la fièvre aphteuse chez des brebis.** [Curious Effects of Foot and Mouth Disease in Sheep.]—*Rec. Méd. Vét.* 1925. Feb. 15. Vol. 101. No. 3. pp. 73–74.

The author records the occurrence of lactation in ewe lambs which had not been served as a result of mild attacks of foot and mouth disease.

MAGALHAES (O. de). **Typhose aviaire.** [Avian Typhoid.]—*C.R. Soc. Biol.* 1925. June 12. Vol. 92. No. 20. p. 31.

The author states that in parts of Brazil he has observed a disease resembling fowl cholera which is due to a bacillus almost identical with *B. sanguinarium*. Once out of 150 experiments he has infected a fowl with virulent liquid passed through a Berkefeld filter. This, he states, must be confirmed.

Vaccination on a large scale (12,000) has completely cleared up endemic centres of infection.

GRANOUILLIT (M.). **Les abcès de fixation dans la peste du buffle.** [Fixation Abscesses in the treatment of Cattle Plague in Buffaloes.]—*Rev. Vét.* 1925. May. Vol. 77. No. 3. pp. 295–297.

The author has found that the injection of 10 to 15 cc. of oil of turpentine into the subcutaneous tissues of the brisket is of value for the treatment of cattle plague in buffaloes.

SCHEIN (H.) & JACOTOT (H.). **La Séro-infection : vaccination préventive contre la peste bovine.** [The Serum-Simultaneous Inoculation against Cattle Plague.]—*Arch. Inst. Pasteur d'Indochine.* 1925. Apr. No. 1. pp. 48–56.

The authors discuss the three factors concerned in the serum-simultaneous inoculation of cattle against cattle plague. They conclude that the part played by variation in the strength of the serum is slight. The virulence of the virus is of more importance, but the most important factor is the general condition of the animal, and, in conjunction with this, the hygienic conditions under which the animals are kept.

CURASSON (G.). **Introduction de la Blue Tongue en Afrique Occidentale Française.** [The Introduction of Blue Tongue into French West Africa.]—*Bull. Soc. Path. Exot.* 1925. Feb. 11. Vol. 18. No. 2. pp. 215–218.

The author gives the history of the introduction of Blue Tongue into Senegal, which occurred towards the end of 1923.

The disease was introduced in merinos imported from South Africa. On arrival they were divided into three lots to be sent to different destinations. After the initial cases the disease died out in two districts where there were no mosquitoes, but persisted in the third where mosquitoes abounded.

ONO (S.). **A Study of Contagious Pleuro-Pneumonia in Imported Cattle.**—*Jl. Jap. Soc. Vet. Sci.* 1925. Mar. Vol. 4. No. 1. pp. 45–48. [Author's English abstract.]

Contagious bovine pleuro-pneumonia first appeared in Japan in September, 1924, when three cases were detected at the Yokohama Quarantine Station among 42 Mongolian cattle imported from Dairen, China.

KIMURA (T.), FUKUSHIMA (T.), & FUJII (T.). **Pathologische anatomie von Lungenseuche (Pleuropneumonia bovis contagiosa) der Rinder in Chosen.** [The Morbid Anatomy of Contagious Bovine Pleuro-Pneumonia in Korea.]—*Sei-i-Kwai Med. Jl.* 1925. Feb. Vol. 44. No. 1. p. 16. [German Abstract of Japanese original article.]

The authors describe the results of their examination of specimens from nine cases of pleuro-pneumonia, obtained during an outbreak in 1922. There appears to be nothing new in the paper.

MISCELLANEOUS.

JOHNSON (E. L.). **Relation of Sheep to Climate.**—*Jl. Agric. Res.* 1924. Nov. 15. Vol. 29. No. 10. pp. 491–500. With 18 charts.

The author adduces reasons, based upon records, why climate must be taken into consideration in the selection and development of various breeds of sheep.

The important periods are the rutting season, period of pregnancy, and of lambing, during which climatic conditions should be favourable.

Sheep thrive best in areas where summers are cool, winters mild, and where the rainfall is sufficient to produce good grazing. The areas of dense sheep population fulfil these conditions.

MARSH (C. D.). **Stock-Poisoning Plants of the Range.**—*U.S.A. Dept. Agric. Dept. Bull.* No. 1245. 1924. Dec. 22. 36 pp. With numerous figs. & plates.

While figures are not available, it is estimated that poisonous plants cause a loss of from 3–5 per cent. of range animals, and it is probable that in some States the figure is much higher. In Wyoming sheep farmers estimate their loss at over 14 per cent. The Bulletin under review has been published with a view to assist stock owners to minimize their losses. Extensive investigations and experiments have been and are being carried out, and definite results have been obtained. To make the publication more valuable to owners many of the illustrations are given in colour. The plants dealt with are as follows :— Liliaceae, Fagaceae, Chenopodiaciceae, Ranunculaceae, Rosaceae, Leguminosae, Rhamnaceae, Umbelliferae, Ericaceae, Asclepiadaceae, Compositae, Ferns.

DONATIEN (A.). **Les Maladies microbiennes des animaux domestiques in Algérie.** [The Diseases of Animals in Algeria.]—*Rev. Gen. Méd. Vét.* 1925. Feb. 15. Vol. 4. No. 398. pp. 65–77.

This paper is a summary of existing knowledge regarding the diseases of live stock in Algeria. It is divided into four sections, which deal respectively with (1) diseases, the nature of the virus of which is still unknown ; (2) bacterial diseases ; (3) diseases due to filterable viruses ; (4) protozoal diseases.

ADLER (S.). **A Disease of Fowls in Palestine characterised by Leucocyte Inclusions.**—*Ann. Trop. Med. & Parasit.* 1925. Mar. 31. Vol. 19. No 1. pp. 127–135. With 17 text figs.

The disease produced shows some resemblance to Spirochaetosis clinically, but is not amenable to treatment with atoxyl or neo-salvarsan. It is of economic importance as it attacks imported breeds and cross-bred poultry. Native fowls are not observed to be attacked. The symptoms are dullness and inappetence, followed by a rise of temperature and diarrhoea. Death takes place in 7 to 14 days.

The inclusions found in the leucocytes were of the following varieties :

(1) Minute granules of chromatin surrounded by a vacuole.
(2) Small regular rings of chromatin.
(3) Spherical solid masses of chromatin.
(4) Irregular bacilliform masses of chromatin.
(5) Clusters of minute granules of chromatin not lying in vacuoles.

Similar inclusions were noticed in the interior of the nuclei of infected cells. The granules were readily distinguished from the ordinary leucocyte granules of the fowl's blood. With Romanovsky they stained like the nuclei of malaria parasites, but more brilliantly. The inclusions present varied very largely in number in different cells.

The percentage of infected cells was as high as 18, and in cells in which the number of inclusions was very large the nucleus had practically disappeared.

On postmortem affected fowls showed the following lesions :—The liver was enlarged and softened, and showed areas of fatty degeneration. There were areas of necrosis in the kidneys.

The evidence obtained by the examination of the blood of apparently normal native birds indicated that these acted as carriers.

MACFIE has expressed the opinion that the inclusions are similar to those described by him as occurring in diseased fowls in the Gold Coast and Nigeria.

Atoxyl, neo-salvarsan, and bismuth sodium tartrate were without curative effects. The disease can be transmitted by blood inoculation.

Experiments failed to provide conclusive evidence regarding the possible transmission of the disease by *Argas persicus*.

LATHBURY (E. B.). **A Case of Snake Bite in a Dog treated with Antivenine Serum.**—*Jl. Royal Army Med. Corps.* 1925. Apr. Vol. 44. No. 4. pp. 290–291.

The dog was bitten by a " pitless " Russells viper. A dose of 15 cc. of anti-venom serum was injected into each flank. There was considerable swelling around the bite, which was on the eyebrow, and subsequently some difficulty in swallowing. For some days the dog could take little or no nourishment and lost a great deal of flesh. Eventually recovery occurred.

WRIGHT (T. W. W.) & TULL (T. C.). **A Preliminary Report of an Investigation of a Condition known as "Dry Coat" in Horses.**—*Veter. Jl.* 1925. May. Vol. 81. No. 5. pp. 235–240.

This condition has been seen in race horses and polo ponies in Penang during the last few years. It occurs in animals imported from Australia.

The clinical aspect of the disease is as follows :—There is a steady decrease in the amount of sweating shown by affected animals after severe exercise, until there is practically no evidence of perspiration at all.

In a few cases animals severely affected have continued to race, but such horses are difficult to keep in condition owing to their capricious appetites. One animal which had had " dry coat " for a year collapsed and died immediately after a race.

Such cases are, however, exceptional. As a rule, with the first appearance of " dry coat " exercise produces dyspnoea which may last for several hours. There is general dullness and laziness. The temperature is high, blood pressure is greatly increased, and the pulse rapid. No oedema has been observed, but there is a diminution in the amount of urine passed. As the case progresses, the animal can scarcely walk, the hair falls out, there is constant fever, and the urine contains albumen and casts.

Opportunity offered to make a complete examination of one mare which was known to have had a " dry coat " for over a year. All attempts at treatment had failed.

The stomach contained numerous specimens of a small worm, probably *Habronema microstoma*. There was an abscess about the size of a pigeon's egg with thick fibrous walls containing worms, probably *Habronema muscae*.

The caecum and colon were heavily infested with small worms which were not particularly identified. The kidneys were enlarged, the enlargement mainly involving the cortex. Microscopically, the smallest vessels were found to be reduced in lumen. Bowman's capsule was thickened. The glomeruli were shrunken, and there was a distinct space between these two structures. The epithelium of the tubes was swollen and granular. The tubules contained hyalin casts. The heart was hypertrophied and weighed a little under 9 lb. The valves showed no gross changes, and there was no pericarditis.

Sections of the aorta showed that the interior was thickened ; there was a reduction in the amount of elastic tissue, but the muscular coat appeared to be normal. The liver was enlarged and fatty, and on section many small necrotic foci were found. There was no cirrhosis.

The spleen was normal. The lungs were emphysematous, but there was no evidence of bronchitis.

Sections of a piece of skin that was devoid of hair showed the following changes. There was moderate thickening of the epidermis, and an almost complete absence of elastic fibres in the chorium. The hair follicles were shrunken. No normal sweat glands could be recognized. Those seen were atrophied to a considerable extent and partially replaced by fibrous tissue.

In view of these findings it was decided to make cultures from the blood of future cases.

It is stated that from each of four cases the same organism has been isolated and autogenous vaccines prepared. No description of the organism is given, but further information is promised.

Details are given of the four cases treated with the vaccines, and definite improvement is reported in each case.

WITJENS (J. C.), VAN LEEUWEN (J. F. H. L.) & VAN DER HOEK (J.). **Influenza equorum.**—*Ned. Ind. Bladen v. Diergeneesk.* 1925. Apr. Vol. 37.

In August a disease appeared amongst the horses at the artillery depôt at Tjimahi, and within a few days a series of cases appeared.

Negative blood examinations allowed surra, anthrax and piroplasmosis to be eliminated. Pernicious anaemia was suggested by the extravasations in the conjunctivae, but against this were the very rapid spread and inflammation of the subcutis, tendons and tendon-sheaths, as well as the absence of lesions in the bone-marrow and the characters of the blood.

It is to be expected that the disease should be introduced from Australia, from which horses are imported every year, and the authors mention several past outbreaks of disease that were probably outbreaks of influenza.

In their description of the disease the authors point out that diagnosis may at first be difficult, as many cases fail to show characteristic symptoms. They lay emphasis on the character of the

symptoms shown by the eyes and neighbouring structures, and on the swelling of the extremities, especially over tendon-sheaths. The course was generally favourable, and little loss of condition was noted. The temperature fell suddenly after about a week of fever, and 3 weeks' convalescence was needed.

They failed to check the outbreak by methods of isolation and disinfection, and they decided therefore to get it over quickly by artificial infection of the healthy, as was done in Holland by BEMELMANS.

Blood was taken aseptically from affected horses, defibrinated and diluted with 3 vols. of normal saline; it was injected subcutaneously, in the neck, in doses of 20 cc.

The following injections were performed :—

GROUP I.—*Infection with diluted blood taken from a naturally-contracted case*—
- A. 10 horses, of which 9 reacted.
- B. 31 horses, of which 30 reacted.

GROUP II.—*Infection with diluted blood taken from an artificially infected horse (injected from a natural case)*—
- A. 44 horses, of which all reacted.
- B. 20 horses, all of which reacted; in this case the virus was used after preservation at room temperature for 24 hours.
- C. 20 horses, of which all reacted; virus kept at room temperature for 48 hours.

GROUP III.—*Infection with blood from one of the horses of* GROUP II (*i.e.*, "*passage-virus*")—
- 41 horses, of which all reacted.

In the course of these inoculations it was seen that the older animals suffered more severely—higher temperatures and more affected clinically.

It appeared that thoroughbreds (*i.e.*, officers' chargers) were less severely attacked.

Only one horse died—a 16 years old Australian gelding. The two horses which failed to react were re-injected, and one then showed a slight reaction; the other was unaffected and probably had a natural resistance.

In 104 horses out of 125 the incubation period was 40 hours; the horses in Group I are omitted from this, as they had been in contact with natural cases.

Altogether 166 horses were injected; the incubation period was 40 hours in 104 cases, as stated above, and it varied from 1 to 15 days. The temperature reached a maximum between 40° and 41° C. in 64 per cent. of cases, and attained 41° C. or over in 29 per cent.

The duration of the fever was from 2 days to as much as 16 or 20 days, averaging about 8 days.

At the depôt there were 98 natural cases; 2 died and one horse had to be destroyed. A careful comparison of these figures, and of the intensity of the temperature reactions and symptoms, showed that the artificial infections were certainly not more severe than the natural cases.

This agrees with the results of BEMELMANS, but not with the views of HUTYRA and MAREK (1922). Moreover, HUTYRA and MAREK state that horses may again become sick one or two weeks after recovery from an infection; but the authors reinjected a few horses after recovery from artificial infection and failed to cause any further signs of disease. They note also that many horses were in contact with natural cases long after their own recovery from artificial infection, but none showed any further illness. A little later there was an

outbreak amongst the horses of another unit, and, as isolation again failed to check it, artificial infection was again resorted to. There were 34 natural cases, and 106 were artificially infected; one horse failed to react, 2 died and one had to be killed on account of posterior paraplegia.

No horses were moved from this garrison within 2 months of the recovery of the last-occurring case, and rigorous disinfection was carried out.*

PREUSS (O. K.). **Osteoporose.**—*Ned. Indische Bladen v. Diergeneesk. en Dierenteelt.* 1925. Apr. Vol. 37. No. 2. pp. 178–181.

The author records three cases of osteoporosis occurring in the same livery stables at Soerabaya—one case in September, 1923, and two in February, 1924.

In the first case the horse, which had been imported from Australia as a racehorse 5 years previously, had not been worked for some months prior to the day of the appearance of symptoms. On that day it was ridden, and at the walk and trot seemed to be fatigued, but when galloped it broke down immediately. The rider then found that both fore- and one hind-limb appeared to be seriously injured, and within an hour the other hind-limb also became affected.

The writer found that the forelimbs had given way, so that the fetlocks came to the ground, and the soles of the feet were almost vertical; the hind feet rested on the heels and bulbs, and the soles made an angle of about 45° with the ground. One hind leg was continually kicking and the hoof, which was bleeding, was seen to dangle.

The horse was destroyed, and on postmortem it was found that in both the forelegs all the lower attachments of the sesamoid ligaments (lig. sesamoidea obliqua, cruciata, et rectum) had been torn away from the sesamoid bones; a few small pieces of bone were still attached to the ends. In both hind legs the flexors were separated from the os pedis, and here again the ends of the tendons showed bone-splinters, the size of a grain of sand, still attached. There were infiltrations with blood in the subcutis in one foreleg, and in one hind hoof the sensitive and horny laminae were separated by blood.

The idea that the cause was mechanical, the writer's first impression, was abandoned, and he took all the evidence to indicate a case of osteoporosis.

In the second case the horse, a small Javan, 10 years of age, was said by the owner to have rheumatism. The gait was peculiar, the horse moving very carefully and taking short steps; and after a little trotting it began to stumble. No abnormalities of the bones could be detected, and the muscles were not sensitive to pressure. The author prescribed pot. iodide and special diet, and some improvement in condition occurred, but the animal died a month later.

The third case was seen by LENSHREK, who diagnosed osteoporosis, and had the horse shot. No clinical description is given, on account of LENSHREK's illness and absence, but he sent specimens to MÜLLER for pathological examination. MÜLLER found:—Tendon of deep flexor, especially distal part and fibres of attachment, lacerated and torn loose from os pedis. The articular cartilage showed light yellow linear irregularities. The ligamentum transversum and tendinous attachments of the superficial flexor showed no abnormality.

* Summarized by Dr. W. H. Andrews, M.R.C.V.S.

Coronary bone—externally on volar surface—linear greyish areas. Microscopically MÜLLER found:—At the ridges of the articular cartilage, the uppermost layers of the cartilage (nearest joint cavity) had separated in the form of wavy strings. At junction of cartilage and bone a cavity was pushed into cartilage. The long lamellae were surrounded by a layer of osteoid tissue.

The lacerated tendon still bore at its insertion-ends a layer of bone, which, moreover, lacked the typical structure of compacta. Numerous bone canaliculi with vessels grew in the direction of the tendon, and between these vessels were found small spherical lime concretions and some infiltration with lymphocytes.*

MOUSSU (R.). **L'intoxication par les graines de** *Cassia occidentalis* **L. est due à une Toxalbumine.** [Intoxication by the Seeds of *Cassia occidentalis* L. is due to a Toxalbumen.]—*C.R. Soc. Biol.* 1925. Mar. 27. Vol. 92. No. 11. pp. 862–863.

ERRATA.

Vol. 13, No. 1, p. 1, last line of summary of VAN DER ELST'S paper, and in title of WALRAVENS' paper, *Trypanosoma rodhain* should read *Trypanosoma rodhaini*.

Vol. 13, No. 1, p. 6, 14th line from bottom, the name of the first author of the paper on *Eimeria utinensis* should read SELAN (U.) not LELAU (U.).

---

* Summarized by Dr. W. H. Andrews, M.R.C.V.S.

TROPICAL DISEASES BUREAU.

TROPICAL VETERINARY BULLETIN.

VOL. 13.] November 30, 1925. [No. 4.

DISEASES DUE TO PROTOZOAN PARASITES.

KLIGLER (I. J.) & WEITZMAN (I.). **Experimental Study of Trypanosomiasis in Palestine.**—*Ann. Trop. Med. & Parasit.* 1924. Dec. 30. Vol. 18. No. 4. pp. 437–458.

The authors give an account of their investigation of an outbreak of trypanosomiasis among mules on a farm in Northern Palestine. In September 1922 an English mare and a native mule became ill and examination showed that trypanosomes were present in their blood. About three months later, in January 1923, four further mules fell sick. The mules had all been on the farm for two or three years, but the mare had been purchased about four months previously.

One male and one female mule were obtained for investigation. At the time of their receipt trypanosomes could not be detected in the blood, but inoculation of dogs established their presence. The period of incubation was seven days.

The effect of subcutaneous injections of ·05 gramme of arecolin was tried on both the mules. The drug caused salivation, defaecation and urination very promptly and after a delay of an hour trypanosomes were found to be present in the blood by microscopic examination.

Further inoculations into dogs, rabbits, and guineapigs showed that the average period of incubation was about a week. Since the original inoculations the trypanosome has been carried on in guineapigs and rabbits.

In experimental animals there were remissions when trypanosomes could not be found in the blood, and parasites were always more scantily present in the blood of rabbits than in guineapigs. This was particularly noticeable just before death.

The duration of illness in mules was not determined, but it was more than six months. Rabbits died in 4 to 8 weeks and guineapigs, in the earlier passages, in 4 to 6 weeks, but later the period of illness extended to 3 months or more. In mules the general symptoms of trypanosomiasis were observed, but there was also occasionally mild haemoglobinuria. In dogs there were clinical symptoms indicating severe illness. In guineapigs, on the other hand, there was not even loss of appetite, even when the blood was swarming with trypanosomes. In rabbits and in dogs keratitis developed. In all animals the blood showed during the course of the infection the changes associated with anaemia.

(K2775) Wt. P.158/184 700 11/25 H & Sp Gp 52

From a study of the morphology of the trypanosome and from a consideration of the results obtained in experimental animals the authors come to the conclusion that the trypanosome belonged to the *T. evansi* group.

Experiments with Bayer "205" on guineapigs and rabbits showed that a dose of 0·1 g. per kilog. always effected what appeared to be a complete cure. The drug was given intraperitoneally in a 5 or 10 per cent. solution at various stages of infection and always with the same result. These doses, however, not infrequently produced toxic effects. Experimentally it was found that the medicinal dose for guineapigs is one-fifth to one-eighth the toxic dose, but that smaller doses may be more toxic for guineapigs infected with trypanosomes than for healthy guineapigs.

Pathological changes directly attributable to the drug were; extensive degeneration of the kidney epithelium, congestion of the renal vessels, deposition of brown pigments in the spleen, small areas of necrosis in the liver.

The drug is capable of exercising a prophylactic power, but its injection during the period of incubation does not prevent the disease from developing. Experiments in which the trypanocidal action of the drug was tested in various dilutions indicated that its sterilizing power *in vitro* is inferior to that possessed by it *in vivo*.

Guineapigs and rabbits which had been cured were subjected to re-infection experiments, and were found to possess an enhanced resistance for 3 or 4 months or more. The period depended upon the dose of the drug to some extent. No evidence could be obtained by experimental means of the existence of any trypanocidal antibody in the sera of recovered animals.

During infection marked changes were observed in the leucocyte formula. There is a marked leucopaenia, but after treatment there is a sharp rise in the total leucocyte count with an increase in the large mononuclears. This condition persists for some time in cured animals.

It was found possible to produce relapses at will by the injection of oil (olive or cod liver oil). Intraperitoneal injections of sterile oil were followed within 24 or 48 hours by relapses. The dose given did not appear to affect the immediate results of the injections, but there seemed to be some connexion between the dose and the persistence of the relapse. The injection of oil in some cases caused a breakdown of resistance. Further, in some cases a breakdown of resistance was produced in an apparently cured animal by injections of oil.

DUKE (H. Lyndhurst). **Polymorphic Trypanosomes of the *T. brucei* Group recovered from the Mwanza Sleeping Sickness Area.**—*Ann. Trop. Med. & Parasit.* 1924. Dec. 30. Vol. 18. No. 4. pp. 415–435.

This paper deals with three strains of trypanosomes of the *T. brucei* group isolated through monkeys, two from human beings and one from wild fly (*G. swynnertoni*). There is also a review of the data obtained from the experimental study of directly-transmitted strains. The three strains were apparently alike in morphology, and they behaved essentially in the same way in laboratory animals. In monkeys the period of illness was about 10 weeks, and in guineapigs about 9 weeks.

Posterior nuclear forms could always be found, but as the strains were passed from animal to animal they appeared to become rarer. The strain which was kept under observation for the longest period lost its power of development in the tsetse, but it is not certain whether the two processes are independent.

The author compares the data obtained with those obtained from a study of the "direct transmission strain" and the "antelope strain", which were isolated respectively from wild *G. palpalis* in January 1920, and a Sitatunga antelope in September of the same year.

These three strains when first isolated were readily transmissible cyclically by laboratory bred *G. palpalis*.

The condensed histories of the strains are as follows :—

Direct transmission strain.—Was still transmissible cyclically after 11 direct passages covering 16 months. About the 18th passage (at 23 months) there was a sudden increase of virulence. After a total of 34 passages covering a period of 30 months, cyclical development in the tsetse was no longer possible. The exact period at which this loss of power occurred was not determined.

Antelope strain.—After 24 direct passages (22 months) the parasite was unable to invade the salivary glands although there was still a heavy gut infection. After 20 further direct passages (10 months) the power to develop in the tsetse had disappeared.

This strain also showed an increase in virulence about the 17th direct passage.

The Mwanza Strain.—This strain after 8 passages (11 months) had almost lost the power of cyclical development. The possibility is suggested that this more rapid loss of power of development in the fly was due to the parasite having been subjected to a number of direct passages from man to man in the fly belt before reaching the individual from which it was isolated.

The author discusses the significance of the facts obtained in his experiments and concludes that in the present state of knowledge we may suppose that under certain circumstances *T. brucei* can establish itself in man, using him as an adventitious host and causing fatal disease, a feature of which is heavy infestation of the peripheral blood. The parasite thus stands an excellent chance of being transmitted mechanically to fresh human hosts, and of maintaining intact those qualities, whatever they may be, which originally determined its establishment in man.

POINCLOUX (P.). **Le mercure et l'arsenic, inhalés en vapeurs, agissent dans la syphilis et le nagana.** [The Actions of Mercury and Arsenic Vapours on Syphilis and Nagana.]—*Compt. Rend. Soc. Biol.* 1925. July 24. Vol. 93. No. 26. pp. 487–489.

The subjection of rabbits infected with syphilis to the vaporization of ·02 g. of mercury heated to 350° C. daily effected a cure in 3 days.

Mice inoculated intraperitoneally with nagana were subjected to the vaporization of 0·04 g. of mercury daily. Either the infection did not develop or recovery took place. When arsenic was used in a similar way for the treatment of syphilis it was found that an effective dose (treatment) was toxic and smaller doses did not effect a cure.

Vaporized arsenic anhydride was found to have a definite curative effect upon mice infected with nagana.

VAN SACEGHEM (R.). **Contribution à l'étude du 309 Fourneau dans les trypanosomiases animales.** [309 Fourneau in the Treatment of Animal Trypanosomiasis.]—*Bull. Soc. Path. Exot.* 1925. June 10. Vol. 18. No. 6. pp. 453–457.

Van Saceghem has carried out a small number of experiments with "309 Fourneau" on cattle infected with *T. cazalboui* var. *vivax* and *T. congolense pecorum*. The drug was given by intravenous injection in 25 per cent. solution.

Details of four animals infected with each parasite are given. The doses ranged from 3 to 10 grammes (2–4 g. per kilog.), and trypanosomes were cleared from the circulation for about a week only. One animal which was given the drug at the rate of 4 g. per kilog. died 6 days later. The author attributes this death to the drug.

KLIGLER (I. J.) & WEITZMAN (I.). **The Mode of Action of Bayer "205" on Trypanosomes.**—*Ann. Trop. Med. & Parasit.* 1925. July 16. Vol. 19. No. 2. pp. 235–241.

After referring to the peculiarities of the drug as regards its action *in vitro* and *in vivo*, and outlining the different views that have been expressed regarding the probable mode of action, the authors point out that the exact mode of action is of more than theoretical importance because estimates of the value of the drug *in vivo* cannot be based upon *in vitro* experiments.

The object of the tests was to ascertain whether there is any relationship between the *in vivo* and *in vitro* effects.

The first experiments were designed to furnish information as to whether exposure to the drug affected the virulence of trypanosomes.

Suspension of trypanosomes in serum were exposed to varying dilutions of the drug for different periods, the trypanosomes being used subsequently for inoculation of rabbits. *T. evansi* was used. The suspensions were kept at 25° C. It was found that three hours' exposure to 1 per cent. destroyed the virulence of the organisms, 0·5 per cent. was variable in action, 0·25 per cent. did not completely destroy virulence but the period of incubation was prolonged.

In the second experiment the conditions were the same save that the exposure was for 24 hours. The dilution of 0·25 per cent. rendered the parasites non-infective.

In the third experiment the conditions of the first were repeated, but smaller doses of trypanosomes were injected into the test animals. All the mixtures were non-infective.

In a further series of experiments dilutions of 1 in 800 and 1 in 1,600 were used for 24 hours. The latter dilution was found to destroy virulence, although the trypanosomes injected showed active movement.

It would appear, therefore, that there is a direct action, and that the curative and prophylactic effects are due to the concentration of the drug in the body and its slow elimination.

Previous experiments showed that in rabbits and guineapigs a dose of 0·1 gm. per kilog. cured all animals, 0·05 g. gave about 80 per cent. of cures, and 0·005 g. was not effective.

This relationship of dose to effect is also illustrated by an experiment in which inoculated rabbits were given doses smaller than the therapeutic dose. ·005 gm. per kilo. failed to prevent infection, while 0·05 prevented the development of the disease.

Experiment indicated that there is a relationship between dose and period of protection obtained. ·05 gm. protected a rabbit when inoculated with trypanosomes 35 days later, but the protection was lost when another inoculation was given after 3 months. 0·1 gm. protected against inoculation one month later, but a second inoculation after a further period of a month caused infection. The period of incubation in this case was, however, longer.

These experiments indicate the necessity of maintaining a degree of concentration of the drug. This was further shown in an experiment in which it was found that the minimal therapeutic dose is the same as the minimal protective dose. The differences observed with regard to the action of the drug in different hosts is probably due to differences in the rate of elimination.

BRUMPT (E.). **Recherches morphologiques et expérimentales sur le *Trichomonas felis* da Cunha et Muniz, 1922, parasite du chat et du chien.** [Morphological and Experimental Studies of *Trichomonas felis* da Cunha & Muniz, 1922, Parasitic in the Cat and Dog.]—*Ann. Parasit. Hum. et Comp.* 1925. July. Vol. 3. No. 3. pp. 239–251. With 3 text figs.

The author has detected the existence of the parasite in young cats in Paris. Hitherto, it had not been noted elsewhere than in Brazil. It occurs mainly in the large intestine, but may be found in the stomach and small intestine.

Cultures are readily obtained by the Boeck and Drbohlav method. Young and adult cats can readily be infected by ingestion, either with faeces or with cultures.

CÉSARI. **La leishmaniose canine en France.** [Canine Leishmaniasis in France.]—*Rec. Méd. Vét.* 1925. Apr. 30. Vol. 101. No. 8. pp. 177–179.

Césari has been able to detect Leishmania in the marrow of bones of two dogs. The dogs were encountered by ROZIER in his practice at Grasse (Maritime Alps).

During life the dogs showed anaemia and skin lesions and at the post-mortem pronounced splenomegaly was found.

NICOLLE (Charles) & ANDERSON (Charles). **L'immunité dans le Kala Azar expérimental du chien avec quelques données sur l'évolution de la maladie chez cet animal. Immunité naturelle et immunité par première atteinte naturelle.** [Immunity in Dogs experimentally infected with Kala Azar, and some Facts regarding the Evolution of the Disease in that Species.]—*Arch. Inst. Pasteur Tunis.* 1925. July. Vol. 14. No. 3. pp. 278–287.

The authors draw attention to the fact that some of the earlier workers did not consider the possibility of dogs acquiring immunity to kala azar as a result of a previous attack contracted naturally. A further point which appears to have escaped notice is the possibility of dogs possessing a high degree of natural immunity.

It is further insisted that in experimental infections a large dose of virus must be used or a light temporary infection is likely to be

produced. For the certain detection of infection in the living animal bone marrow, preferably from the tibia, or liver pulp must be examined.

As a result of their experiments the authors find that a dog which had made a complete recovery from an experimental infection is immune to infection with doses of virus which will certainly infect fresh dogs. It appears to be probable that natural attacks confer a similar immunity but this has not been established. In any case, it is desirable to use very young dogs for experimental purposes even in countries like Tunis, where the natural disease is rare, to avoid the possibility of using an immune animal.

There is no evidence to show that dogs may possess a natural immunity to infection.

In carrying on the virus in dogs it is best to inoculate four or five animals at a time, and select that showing the most severe infection for carrying on. The most suitable time for obtaining virus for fresh inoculations is at about two and a-half to three months.

NICOLLE (Charles) & ANDERSON (Charles). **Recherches expérimentales sur le mode de transmission du kala azar.** [Experiments regarding the Transmission of Kala Azar.]—*Arch. Inst. Pasteur Tunis.* 1925. July. Vol. 14. No. 3. pp. 264–277.

The experiments which the authors detail fail to provide a solution to the question of the manner in which kala azar is transmitted. Bugs were used, but no evidence was obtained that they can carry the infection from dog to dog.

PÉRARD (Ch.). **Recherches sur les coccidies et les coccidioses du lapin.** [The Coccidia and Coccidioses of the Rabbit.]—*Ann. Inst. Pasteur.* 1925. June. Vol. 39. No. 6. pp. 505–542.

In the experiments recorded in this paper the author has studied the biology of the oocysts with a view to formulating some plan for controlling infection among rabbits. He finds that non-segmented oocysts can be kept in the living condition at 0°–2° C. Bacterial contaminations delay sporulation, and finally lead to the death of oocysts. Oocysts which have sporulated may remain viable for more than a year if kept moist and between 0° and 38° C. The majority of chemical disinfectants are not destructive to coccidia, but rather favour their survival by destroying bacteria. Complete desiccation is fatal to oocysts, and temperatures above 40° C. are also destructive to them. Freezing is also fatal as a rule. Sporulated parasites are more resistant to external influences than the non-sporulated.

PÉRARD (Ch.). **La prophylaxie des coccidioses.** [Prophylaxis against Coccidial Infections.]—*Rev. Gen. Méd. Vét.* 1925. Aug. 15. Vol. 34. No. 404. pp. 421–428.

The facts upon which prophylactic measures can be based are as follows :—

1. Coccidia are specific for their hosts.
2. Apart from epidemics, the infestations are maintained by recovered animals.
3. The minimum period for which excreted oocysts are not infective is 30 hours at 25° C.

4. Between temperatures of $-2°$ C. and 38° C. coccidia maintain their vitality in moist surroundings for periods up to a year or more.

5. Oxygen is necessary for the process of sporulation. Fermentation, and particularly ammoniacal fermentation in dung heaps, hinders or prevents sporulation, and finally proves fatal.

6. The majority of chemical disinfectants are without action on oocysts, but actually favour their development by sterilizing the medium in which they are.

7. On the other hand, heat, cold and desiccation are fatal to the parasites.

8. Non-sporulated oocysts are more readily destroyed by these agents than sporulated parasites.

RAU (A. N.). **Haemogregarina canis.**— *Veter. Jl.* 1925. June. Vol. 81. No. 1. pp. 293–307. With 2 plates.

The author records three cases of natural infection in dogs with *Haemogregarina canis* in Madras. Examination of blood smears from pariah dogs and well-cared-for animals indicated that the infection is far more common in the former than in the latter. A description of the parasite as it occurs in the peripheral blood is given. The host cells are usually polymorphonuclear leucocytes, and the parasite appears to be encysted in the cytoplasm. In hanging drop preparations the organisms may sometimes be observed during the process of emergence from their host cells. The free parasites are vermicule-like. Schizogony occurs in the bone marrow, spleen, and liver, and schizonts acquire an envelope which is resistant to the penetration of stains. The individual merozoites resemble the vermicules, but are smaller.

The writer states that he is able to confirm CHRISTOPHERS' observations regarding the development of the parasite in *R. sanguineus*. This he has done, using ticks from naturally-infected dogs and laboratory-bred ticks fed upon experimentally-infected dogs.

The parasite causes a subacute febrile disease, the temperature ranging from 98° to 106° F., and there is marked and rapid emaciation.

Treatment with trypanblue, salvarsan, and tartar emetic have not effected a cure.

GILBERT (S. J.). **Treatment of Acute Theileria (Egyptian Fever) by Inoculation with "Immune" Blood.**— *Jl. Comp. Path. & Therap.* 1925. June. Vol. 38. Pt. 2. pp. 91–93.

A Jersey bull imported from England into Palestine in August, 1924, showed evidence of infection with Theileria on March 18th, 1925. As previous experience showed that medicinal treatment was valueless it was decided to subject the animal to inoculations with blood from a native cow bred in a tick-infested area. During the period March 21st to 30th the animal was given nine doses of blood. The first four doses were 750 cc., and the remaining five 500 cc. The larger doses were given partly intravenously and partly subcutaneously, and the smaller doses intravenously. There was an almost immediate fall of temperature to about normal. It was noted that on the day when the injection of blood was missed the temperature rose to 104·4

again. Parasites were present in large numbers on the day before injections began, and on the first day of injection, but subsequently none were found. From the 8th to the 12th days the bull's blood showed very marked evidence of anaemia.

MROWKA (F.). **Das Texasfieber in Peru.** [Texas Fever in Peru.]—Reprinted from *Zeitschr. f. Veterinärkund.* 1925. May. No. 5. With 6 figs. and 31 charts.

The author describes the occurrence of redwater and anaplasmosis in Peru, and he is of the opinion that the two diseases are not in reality separate entities.

FRANÇA (C.). **Notes parasitologiques sur l'Angola.** [Notes on Parasites in Angola.]—*Ann. Parasit. Hum. et Comp.* 1925. July. Vol. 3. No. 3. pp. 255–262. With 3 text figs.

The author describes trypanosomes and Haemogregarines found in *Bufo regularis.*

MROWKA (F.). **Die Entwicklung der Sarkosporidien und ihre Beziehung zu Lahmkrankheit der Haustiere in Peru.** [The Development of Sarcosporidia and their Connection with Lamziekte of the Domesticated Animals in Peru.]—Reprinted from *Zeitsch. f. Veterinärk.* 1925. June. No. 6.

The author describes a disease of the domesticated animals which he believes to be identical with the Lamziekte of South Africa. It attacks lambs, ewes, calves of both sexes, and cows, and occasionally filly foals.

As a result of microscopic examination of tissues from affected animals he arrives at the conclusions that the condition is caused by sarcosporidia and that sarcosporidia are not in reality protozoa. "They owe their autochthonous origin from muscular tissue with nuclear characters to the irritation caused by an as yet unrecognized cause, which is localized in the muscular tissue and causes a slight disturbance of the circulation of the fat. An unknown factor causes so sudden a development of gram-positive elements in the blood and muscular tissue that severe disturbances of nutrition and function are brought about in the latter and the symptoms recognized as those of Lamziekte or Renguera are produced."

TORRES (S.). **Toxoplasmas dos Animaes.** [Toxoplasmosis in Animals.]—*Boletin da Soc. Brasil. Med. Vet.* 1924. July. Vol. 1. No. 7. pp. 251–264.

This paper is a summary and contains nothing new.

GILBERT (S. J.). **A Note on the Occurrence of Bovine Spirochaetosis in Palestine.**—*Jl. Comp. Path. & Therap.* 1925. June. Vol. 38. Pt. 2. pp. 94–95.

The first case occurred naturally in a Damascus cow imported from Beyrouth. Spirochaetes were found which appeared to be identical with *S. theileri.*

A Jersey bull was inoculated with half a litre of blood on February 17th. No spirochaetes appeared in the blood up to the 31st March, when the bull contracted Egyptian fever. This infection was treated by injections of blood from a native cow (*see above*) between March 21st and 31st. On April 6th spirochaetes were found in the blood, but these had disappeared by April 8th.

ALVAREZ (R. G.). **Contribución a la histologia patológica de la Sarcosporidiosis muscular del cerdo.** [The Pathological Histology of Sarcosporidioses.]—*Revist. Hig. y Sanid. Pecaur.* 1925. July. Vol. 15. No. 7. pp. 387–394. With 4 text figs.

BRUG (S. L.), DEN HEYER (J. K.) & HAGA (J.). **Toxoplasmose du lapin aux Indes Orientales Néerlandaises.** [Toxoplasmosis of the Rabbit in the Dutch East Indies.]—*Ann. Parasit. Hum. et Comp.* 1925. July. Vol. 3. No. 3. pp. 232–238. With 6 plates.

MARTIN (M. A.). **L'entérite coccidienne du chien et du chat.** [Coccidiosis in the Cat and Dog.]—*Rev. Vét.* 1925. Sept. Vol. 77. No. 9. pp. 537–548. With 2 text figs.

DISEASES DUE TO METAZOAN PARASITES.

BELPEL (J.). **De l'habronemose cutanée des Equides.** [Cutaneous Habronemiasis of Equines.]—*Rev. Vét.* 1925. Jan. Vol. 77. No. 1. pp. 5–24. With 4 text figs.

In one case the author obtained good results by the application of an ointment containing novarsenobenzol locally, and by intravenous injections of the same drug. On four successive days doses of 1·5, 2, 2, and 2·5 g. were given, and after an interval of 8 days further doses of 2, 2·5, 2·5, and 3 g.

NEWSTEAD (R.) & POTTS (W. H.). **Some Characteristics of the First Stage Larva of** *Dermatobia hominis* **Gmelin.**—*Ann. Trop. Med. & Parasit.* 1925. July 16. Vol. 19. No. 2. pp. 247–260. With 2 plates.

This fly is responsible for serious losses mainly on account of damage done to hides in Central and South America. The larvae are able to penetrate unbroken skin and cause warbles similar to those seen in Europe. According to DA MATTA the percentage of hides damaged ranges from 5 to 70 per cent.

The fly differs from all other members of its class in that it does not lay its eggs direct on the animal's body, but on the bodies of other insects, chiefly mosquitoes. The larva appears to emerge from the egg when the mosquito alights on a warm-blooded animal for a feed. There is evidence to show that if the larva cannot emerge entirely while the mosquito is feeding, it withdraws again into the egg and awaits another opportunity.

The authors give a summary of the life-history of the fly.

The larvae of the fly have been found in cattle, dogs, pigs, goats, turkeys, and, rarely, mules. It is doubtful whether they occur in sheep, donkeys, and horses. They have also been found in monkeys, jaguar, tapir, coati, agouti, deer (rarely), squirrels, and birds.

The deposition of the eggs upon other flies and upon mosquitoes has been observed and the larvae obtained have been reared to the adult stage in dogs. The whole process from the laying of eggs to emergence of the adult requires 120–141 days.

The authors give a list of insects which have been found bearing batches of eggs in various parts of South America.

For the detailed description of the first stage larva the original article should be consulted.

STEPHENS (J. W. W.). **The Golubacser Fly.**—*Ann. Trop. Med. & Parasit.* 1925. July 16. Vol. 19. No. 2. pp. 262–263.

Stephens quotes an interesting reference to *Simulium columbaschense* Köll, taken from the "Romance of Natural History," by P. H. GOSSE, F.R.S., Second Ed. 1861, p. 111, showing that the severe attacks of these flies have been observed many years ago.

ROUBAUD (E.). **Nouveaux diptères piqueurs de l'est africain.** [New Blood-Sucking Diptera from East Africa.]—*Bull. Soc. Path. Exot.* 1925. June 10. Vol. 18. No. 6. pp. 465–469. With 2 text figs.

The species described are *Hippobosca camelopardalis* n. sp., which appears to be specific for the giraffe and *Stomoxys rhodainica*, which is closely allied to *St. inornata* Grünb., but differs from that in details of general coloration. The specimens upon which the descriptions are based were collected by RODHAIN during the operations in East Africa, 1915–1916.

ROUBAUD (E.). **Une nouvelle espèce de puce-chique pénétrante, parasite des rats en Chine :** *Dermatophilus lagrangei* **n. sp.** [A New Species of Jigger, parasitic in Rats in China.]—*Bull. Soc. Path. Exot.* 1925. May 13. Vol. 18. No. 5. pp. 399–405. With 6 figs. on 1 plate & 6 text figs.

The principal features of the parasite as seen in the mature female are as follows :—Eyes absent ; abdomen oval and drawn out posteriorly into a cylindrical manubrium. Cephalic region masked laterally by two symmetrical pairs of ampulla-like protuberances developed from the anterior parts of the abdomen.

The parasite invades the ears exclusively.

CHARRIER (H.). **Ixodes de la région de Tanger.** [The Ixodes of Tangier.]—*Bull. Soc. Path. Exot.* 1925. June 10. Vol. 18. No. 6. pp. 469–470.

The Ticks encountered in Tangier are—

Rhipicephalus :

R. sanguineus (dog and ox).

R. bursa (ox and horse).

Boophilus (*Margaropus*) *:*

B. annulatus var. *calcaratus* (ox).

Hyalomma :

H. aegyptium (ox and horse).

STILES (C. W.) & ORLEMAN (M.). **The Cestode Genus *Hydatigera* Lamarck, 1816, Species *Reditaenia* Sambon, 1924.**—*Jl. Trop. Med. & Hyg.* 1925. July 1. Vol. 28. No. 13. pp. 249–250.

The authors invite attention to the alteration proposed by SAMBON to prevent, if possible, the use of the generic term *Reditaenia*, as it would appear to be certain that it would have to be changed again. If the new taxonomic unit proposed is accepted as of either generic or subgeneric value the correct name would be *Hydatigeria* with *Reditaenia* as a synonym.

SOUTHWELL (T.). **On a New Cestode from Nigeria.**—*Ann. Trop. Med. & Parasit.* 1925. July 16. Vol. 19. No. 2. pp. 243–246. With 4 text figs.

The author figures and describes *Lateriporus fuhrmanni* n. sp. from a "large grey eagle". The parasite differs from the other species of the genus mainly in the size of the hooks.

WARE (F.). **Some Parasitic Infections of Comparative Interest.**—*Jl. Comp. Path. & Therap.* 1925. June. Vol. 38. Pt. 2. pp. 89–91.

Ware has examined material forwarded to him by the Superintendent, Government Ophthalmic Hospital, Madras, and has found *Cysticercus cellulosae* (three times) and what appeared to be a sterile hydatid of *Echinococcus granulosus* in tissues from various parts of the eye in human beings.

GOODEY (T.). **Skin Penetration by the Infective Larvae of *Dochmoides stenocephala*.**—*Jl. Helminth.* 1925. Aug. Vol. 3. No. 3–4. pp. 173–176.

Using the cork raft method the author found that ensheathed larvae were capable of penetrating skin without first escaping from their sheaths.

MASSINO (B.). **Ein neuer Nematode des Hundes : *Rictularia cahirensis* Jägerskiöld 1909.** [A New Nematode of the Dog : *Rictularia cahirensis* Jägerskiöld 1909.]—*Berlin. Tierärzt Woch.* 1925. Jan. 30. Vol. 41. No. 5. pp. 67–69.

The author records the occurrence of this parasite in dogs in Bokhara.

CHAPIN (E. A.). **New Nematodes from North American Mammals.**—*Jl. Agric. Res.* 1925. April 1. Vol. 30. No. 7. pp. 677–681. With 4 text figs.

The author describes the following :

From the bison, *Dictyocaulus hadweni*, n. sp., *Ostertagia bisonis*, n. sp. and from the beaver, *Trevassosius americanus*, n. sp., *Castrostrongylus*, n. gen. *Castrostrongylus castoris*, n. sp.

TAYLOR (E. L.). **Notes on Some Nematodes in the Museum of the Liverpool School of Tropical Medicine.**—*Ann. Trop. Med. & Parasit.* 1924. Dec. 30. Vol. 18. No. 4. pp. 601–618. With 18 text figs.

The author describes *Porrocaecum crocodili*, *Amplicaecum africanum*, *Strongyluris brevicaudata*, *Africana africana*, *Oxyuris praeputialis*, and *Tricuris discolor*.

LEDOUX (M.). **Sur un cas de spirocercose canine.** [A Case of Canine Spirocercosis.]—*Rev. Vét.* 1925. March. Vol. 77. No. 3. pp. 155–157.

A fox terrier showed progressive wasting, frequent cough, practically constant vomition after the ingestion of solids, but there was no elevation of temperature, and the animal was quite lively.

Ordinary treatment for gastritis was without effect—in fact, there was steady progress of the symptoms. At the postmortem examination the oesophagus was found in its thoracic portion to be extremely dilated, and at the point of penetration of the diaphragm there was a cyst with a thick fibrous wall which almost occluded the lumen. In the left sac of the stomach there was a second cyst about the size of a small nut. These cysts contained 8 and 6 worms respectively.

The aorta was thickened and sclerosed. At the original of the iliac arteries there was a group of nodules about the size of lentils.

WARE (Frank). **Two Uncommon Nematode Parasites of Cattle.**—*Jl. Comp. Path. & Therap.* 1925. June 30. Vol. 38. No. 2. pp. 83–89. With 2 text figs.

The writer describes *Agriostomum vrybergi* and *Syngamus laryngeus* emending the previously published accounts in certain particulars.

SCHWARTZ (Benjamin). **Internal Metazoan Parasites collected from Ruminants in the Philippine Islands.**—*Philippine Jl. Sci.* 1925. Apr. Vol. 26. No. 4. pp. 521–533. With 2 plates.

This paper contains a brief summary of the parasites found in cattle, Indian cattle, carabao, Indian buffalo, sheep and goats in the Philippine Islands.

No new species are described.

BRU (M. P.). **L'hémothorax par Spirocercose aortique chez le chien.** [Haemothorax resulting from Infestation of the Aorta by Spirocerca in the Dog.]—*Rev. Vét.* 1925. Jan. Vol. 77. No. 1. pp. 26–32.

DESCAZEAUX (M. J.). **Sur la présence au Chili de l'*Ornithodoros megnini*.** [The Occurrence of *Ornithodorus megnini* in Chili.]—*Bull. Soc. Path. Exot.* 1925. May 13. Vol. 18. No. 5. pp. 408–409.

HOBMAIER (M.). **Die Entwicklungsgeschichte und die pathologische Bedeutung von *Physocephalus sexalatus* (*Spiroptera sexalata*, Molin).** [The Cycle of Development and the Pathological Importance of *Physocephalus sexalatus* (*Spiroptera sexalata*, Molin).]—*Münch. Tierärzt. Woch.* 1925. Vol. 76. No. 17–20. With 5 text figs.

IHLE (J. E. W.). **Verzeichnis der Cylicostomum-Arten der Equiden, mit Bemerkungen über einzelne Spezies.** [A Catalogue of the Cylicostomes of the Equidae.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1925. June 8. Vol. 95. No. 2/4. pp. 227–236. With 4 text figs.

LARROUSSE (F.). **Contribution à l'étude des tiques de l'Annam; description de deux espèces nouvelles du genre** *Haemaphysalis*: *H. obesa* **n. sp., et** *H. lagrangei* **n. sp.** [Two new species of Ticks from Annam, *Haemaphysalis obesa* and *H. lagrangei*.]—*Ann. Parasit. Hum. et Comp.* 1925. July. Vol. 3. No. 3. pp. 301–305. With 3 text figs.

NEVEU-LEMAIRE (M.). **Description d'un strongle nouveau du Rhinocéros Africain** *Quilonia parva* **n. sp.** [A new Strongyle of the African Rhinoceros, *Quilonia parva* n. sp.]—*Ann. Parasit. Hum. et Comp.* 1925. July. Vol. 3. No. 3. pp. 290–291. With 6 text figs.

NÖLLER. **Bermerkungen zu der vorstehenden Arbeit von Dr. M. Zunker:** " *Echinostoma columbae* **n. sp. ein neuer Parasit der Haustaube.** [Observations on the foregoing paper by Zunker.]—*Berlin. Tierärzt. Woch.* 1925. July 31. Vol. 41. No. 31. pp. 384–385.

SAMBON (L. W.). **Gongylonema.**—*Jl. Trop. Med. & Hyg.* 1925. Sept. 1. Vol. 28. No. 17. pp. 313–316. With 2 text figs.

SOUTHWELL (T.). **On a Collection of Linguatulids in the Liverpool School of Tropical Medicine.**—*Ann. Trop. Med. & Parasit.* 1924. Dec. 30. Vol. 18. No. 4. pp. 515–531.

SOUTHWELL (T.) & MACFIE (J. W. S.). **On a Collection of Acanthocephala in the Liverpool School of Tropical Medicine.**—*Ann. Trop. Med. & Parasit.* 1925. July 16. Vol. 19. No. 2. pp. 141–184.

SPREHN (C.). **Ein Beitrag zur Dochmiasis der Rinder.** [Dochmiasis in the Ox.] —*Berlin. Tierärzt. Woch.* 1925. July 31. Vol. 41. No. 31. pp. 485–486. With 3 text figs.

WOODLAND (W. N. F.). *Tetracampos* **Wedl 1861 as a Genus of the Bothriocephalidae.**—*Ann. Trop. Med. & Parasit.* 1925. July 16. Vol. 19. No. 2. pp. 185–189.

ZUNKER (M.). *Echinostoma columbae* **n.sp. Ein neuer Parasit der Haustaube.** [*Echinostoma columbae* n.sp. A New Parasite of the Pigeon.]—*Berlin. Tierärzt. Woch.* 1925. July 31. Vol. 41. No. 31. pp. 483–484. With 2 text figs.

BACTERIAL DISEASES.

WARWICK (B. L.), GILDOW (E.M.) & HADLEY (F. B.). **The Use of Rabbits in the Study of Infectious Abortion.**—*Jl. Infect. Dis.* 1925. July. Vol. 37. No. 1. pp. 62–67.

The authors think that rabbits are more suitable than guineapigs for studying certain problems in connexion with infectious abortion. They have found that while infection rarely occurs by direct contact, the rabbit develops a wider range of lesions than the guineapig as the result of intraperitoneal inoculation.

They have set themselves to find answers to the following questions: Will a virulent strain produce abortion in rabbits, and can the organism be recovered from the foetuses? What is the period of incubation? How early and how late in pregnancy can abortion be produced?

Of 14 does inoculated during pregnancy, all but 1 produced dead foetuses, and usually before the end of the normal period of gestation. Two litters which were carried to full term were not completely developed. In most cases the period of incubation was from 7 to 11 days. Cultures were obtained from foetuses of every litter of does inoculated between the 14th and the 24th day of pregnancy.

In one case an inoculated doe produced a normal litter. But cultures were obtained from the foetuses.

The experiments were carried out with a strain of organism of porcine origin.

BOSWORTH (T. J.) & GLOVER (R. E.). **Contagious Abortion in Ewes.**—*Vet. Jl.* 1925. July. Vol. 81. No. 7. pp. 319–334.

During the last two years seven outbreaks of abortion among ewes have come under the notice of the writers.

In all cases the main facts of the outbreaks were substantially the same. Abortions may begin six weeks before full time, and continue throughout the season. As a rule, premonitory symptoms are slight or absent. Depression, stiffness of gait, and a blood-tinged vaginal discharge are the symptoms seen.

Postmortem examination of a ewe shows oedema of the uterus, which contains a clear straw-coloured liquid. The cotyledons are swollen, and their crypts contain yellowish-white pus.

The subcutaneous tissue of the foetuses is infiltrated with blood-tinged gelatinous oedema. The serous cavities contain a similar exudate, and the tissues are generally moist and pale in colour.

From ewes and foetuses in different outbreaks there has been isolated an organism having the following characters: A gram-negative pleomorphic bacillus, which in young cultures appears to be oval, but in older cultures definite bacilli and even short filaments are found. It is a facultative anaerobe.

On agar minute transparent colonies form within 18 hours, and these increase in size until by the 48th hour they measure about 3 mm. These colonies are round, translucent and raised. Turbidity is produced in broth with subsequent sedimentation. Growth is more abundant in glucose broth and a few bubbles are formed. In glucose agar shake cultures the medium is disrupted by gas formation. There is no growth on potato. Gelatin is slowly liquefied. Glucose, maltose, laevulose, and mannite are fermented. There is no change in litmus milk after 10 days.

The organism will remain alive in liver broth at room temperature for 16 months without losing virulence for mice. Exposure to 56° C. for 30 minutes is not fatal, nor is an exposure to 60° C. for 15 minutes. 58° C. for half-an-hour is fatal.

Normal sheep serum may possess feeble agglutinating powers (1 in 25 only), but the sera of ewes that have aborted cause agglutination in dilutions ranging from 1 in 50 to 1 in 1,000. Small doses of culture are fatal to mice in 3 to 8 days. There is enlargement of the spleen and, if the inoculation is intraperitoneal, the formation of a diphtheritic deposit. Unless large doses (1–2 cc.) of culture are used the organism produces only a large local abscess in rabbits and guineapigs. Two lambs were inoculated subcutaneously with culture. One was killed when comatose on the 4th day, and the other died on the 4th day. A swelling at the seat of inoculation, enlargement of the spleen, diffuse enteritis, and a peritoneal exudate were the lesions found. The organism was recovered from the local lesion, heart blood, and spleen.

In a preliminary experiment with ewes, 5 pregnant animals were inoculated. Two aborted, but the organism was not recovered.

An agglutination test of the flock was negative, but the inoculated animals showed a high titre. The inoculated ewes were mixed with the rest of the flock. After three months the in-contact animals had developed agglutinin. These ewes were tested at intervals, and it was found that the titre gradually declined, but that there was a sharp rise about the time of the next parturition.

Subsequently, six ewes in which the agglutination titre had fallen nearly to zero were fed on five occasions at intervals of a week with

broth culture. Two aborted dead lambs from which the organism was recovered, one gave birth at full term and the organism was recovered from the vaginal discharge, one lambed normally, and two were barren.

At the lambing season of 1925 there were 12 ewes which had not been infected artificially, but which had been in contact. Eleven of these lambed normally and one aborted four days before full term. The organism was not recovered. At the time of lambing three ewes showed agglutination titres of 1 in 100 or more, six of 1 in 50, and the remainder were negative.

The six ewes experimentally infected in 1924 were served in December of that year. One did not become pregnant, one died three weeks prior to lambing of fatty infiltration of the liver; the organism was not recovered; one aborted and the organism was recovered from both uterus and lambs, and three lambed normally. The organism was isolated from the uterus of one of these three immediately after lambing.

The paper concludes with an appendix of the details of experiments with ewes.

MERLE (M.). **L'avortement contagieux des juments.** [Contagious Equine Abortion.]—*Rev. Gen. Méd. Vét.* 1925. Sept. 15. Vol. 34. No. 405. pp. 485–490.

In Finistère, in some years, from one-third to two-thirds of the foals are lost. The symptoms usually are dullness, loss of appetite, slight attacks of colic, oedema of the mammae, filling of the hind legs and a more or less purulent discharge from the vagina. There is a difference of opinion as to whether there is any dystokia when abortion occurs. The foetal liquids are usually turbid and sometimes blackish in colour.

Portions of the afterbirth are frequently retained and the placenta shows brownish areas the tissues of which are friable. The foetus is generally born dead, but when the abortion occurs at nearly full term it may survive for a day or two. When the foetus has been slipped the mares frequently show symptoms of severe illness associated with purulent metritis. The mortality among infected mares, however, does not exceed 2 or 3 per cent. The majority of abortions occur between the 6th and 9th month, but the act may be delayed until nearly full term is reached.

Epidemics appear to vary in severity from year to year, and it appears to be certain that abortion does not occur in the same mare two years running.

The etiology of the disease has not been established.

JORGENSEN (G. E.). **Some Studies of** *Pasteurella boviseptica.*—*Cornell Vet.* 1925. July. Vol. 15. No. 3. pp. 295–302.

The author finds as a result of bacteriological examination of swabs taken from the nasal cavities of 250 cattle that about 15 per cent. of these were carriers of *B. bovisepticus*. In circumstances likely to lower the animal's resistance infection is likely to take place. The three types of bacillus described by JOHNES were encountered together with a fourth which differed from the other three in that it fermented dulcite, grew more luxuriantly, was highly virulent, and was not agglutinated by the antisera of the other three types.

In infection experiments one cow was made to inhale a vapourized culture. This was followed by acute congestion of the lungs and a mild carpal arthritis. After recovery a broth culture was administered per os. There was no ill effect. No effect followed an intravenous inoculation with 50 cc. of broth culture. The agglutination titre, which was negative at first, steadily mounted during the experiments.

A second cow which was given culture per os was subjected to fatigue and cold. Fatal haemorrhagic septicaemia developed.

GUEVEDO (J. M.). **El Carbunclo sintomatico argentino.** [Argentine Blackquarter.]—*Revist. Med. Vet.* 1925. Apr.–May. Vol. 8. No. 1. pp. 9–12.

The author questions whether ZANOLLI and SORDELLI are correct in expressing the view that the disease known as la Mancha in the Argentine is identical with blackquarter.

BASSET (J.). **Infection latente dans le charbon symptomatique.** [Latent Infection in Blackquarter.]—*Compt. Rend. Soc. Biol.* 1925. June 26. Vol. 93. No. 22. pp. 170–171.

The expression " latent infection " covers different conditions, which must be carefully distinguished. The author classifies these as follows:

1. Reservoirs of the virus. In this case it is the ground.
2. The period of incubation. This is practically absent in blackquarter since symptoms appear within 8 hours of the introduction of a sufficient quantity of infective material.
3. The condition of latent infection properly so-called. This is characterized by the existence of a discrete infection for the recognition of which special technique is required.

In the author's experiments with guineapigs inoculated with a very small dose of culture no trace of the organisms could be found at the seat of inoculation after the lapse of three weeks. He further found that such an infection is not aggravated by the introduction of an immunizing dose of toxin.

4. Chronic carriers. A guineapig which was inoculated and developed a lesion recovered. This animal was placed in conditions to reduce its resistance, and the inoculated region was injured three weeks after recovery, but no recrudescence of the lesion appeared. When killed 6 weeks after inoculation bacilli and spores were found in the lymphatic gland nearest the seat of inoculation.
5. Healthy carriers. Inoculation experiments carried out with spores showed that spores may persist in the tissues of animals without setting up the disease for periods of 12 days or more. The disease may be induced in such animals by injury, by hydroxylamine, or toxin at the seat of inoculation. The disease does not develop if the toxin is injected at a place removed from that into which the spores were introduced.

Spores in a state of purity confer no immunity, and a dose of serum does not lead to the destruction of spores in healthy carriers.

BASSET (J.). **Atténuation de** *B. chauvaei.* **Anatoxine symptomatique.** [Attenuation of *B. chauvaei.* Anatoxin.]—*Compt. Rend. Soc. Biol.* 1925. June 26. Vol. 93. No. 22. pp. 172–173.

The author states that he has been able to confirm the results reported by KITASATO (1889) and KITT (1893) that prolonged incubation at

37° C. causes a loss of virulence in cultures of *B. chauvaci*, and that such cultures may be used as vaccines. Four subcultivations in liver broth at intervals of 6 weeks produced the result that doses of 0·5 cc. caused only a temporary oedema while the original culture in doses of $\frac{1}{16}$ cc. was fatal in 60 per cent. of guineapigs in 20 to 36 hours. Guineapigs inoculated with such attenuated cultures acquired a solid immunity. The morphology of such organisms was changed. Even in young cultures only a minority of the organisms are gram positive, and cultures that are a fortnight old contain no gram positive organisms at all. Spores are very rarely found.

Experiments in which such cultures were used for guineapig inoculation after heating showed that the spores themselves were attenuated. The author states that the toxin can be converted into an anatoxin by the addition of 0·5 per cent. formalin and incubation at 38° to 40° for 30 days.

BASSET (J.). **Immunisation des bovidés par la toxine symptomatique.** [The Immunization of Cattle against Blackquarter by means of Toxine.]—*Compt. Rend. Soc. Biol.* 1925. June 26. Vol. 93. No. 22. pp. 168–170.

The toxicity of filtrates from serum liver broth cultures of *B. chauvaei* undergoes little or no change, when they are kept in sealed vessels, in periods ranging from 2 to 4 months.

Doses of 5 cc. of such filtrates conferred a high degree of immunity upon guineapigs, enabling them to resist doses of $\frac{1}{8}$ and $\frac{1}{4}$ cc. of virus. This virus, in doses of $\frac{1}{16}$ cc., proved fatal to 10 out of 15 guineapigs in 20 hours to 3 days, and in doses of $\frac{1}{8}$ cc. to 13 out of 15 in 17 to 24 hours. Two doses of toxin given at an interval of 15 days enabled them to resist doses of 0·5 to 3 cc. of virus.

In experiments with cattle the author found that the lethal dose of virus for a bovine of 15 months to 2 years of age was about 0·25 cc. of virus, or twice the lethal dose for the guineapig. In his immunization experiments three groups of animals under three years of age were used. Each animal was given a subcutaneous injection of toxin which had been preserved with the exclusion of air for periods ranging from three weeks to 2 months. The injections caused a slight temporary rise of temperature and the formation of a plaque of oedema which disappeared in about a week. From 12 to 16 days later they were given 0·25 cc. of virus. The controls died in 2 days, but the protected animals showed no disturbance of health of any kind.

In an experiment to test the effect of the injection of toxin into an animal that was in a condition of latent infection, 12 guineapigs were inoculated subcutaneously on the neck with 1 cc. of "pure spores," and on the following day with 5 cc. of filtrate subcutaneously in the thigh. None became infected. Two bovines were inoculated subcutaneously with $\frac{1}{16}$ cc. of culture. A marked local lesion developed, but it was soon apparent that recovery would take place. The injection of 10 cc. of toxin on the 4th day led to no aggravation of symptoms.

A bovine was inoculated simultaneously on the two sides of the body with 10 cc. of toxin and 0·25 cc. of "2nd Pasteur vaccine."* A control received vaccine alone. On the fourth day after the injection of virus there was extensive oedema and an elevation of temperature.

* It would appear from the context that this was anthrax vaccine.—ED.

The toxin did not lead to any aggravation of the symptoms. The animal which received the vaccine and toxin subsequently withstood a lethal dose of *B. chauvaei*.

It remains to be shown how long the immunity lasts.

LECLAINCHE & VALLÉE. **L'immunisation contre le charbon symptomatique.** [Immunization against Blackquarter.]—*Rev. Gén. Méd. Vét.* 1925. June 15. Vol. 34. No. 402. pp. 293–301.

This paper is a review of the methods that have been used for immunization against blackleg. It is divided into three sections, dealing respectively with immunization by (*a*) vaccines, (*b*) toxins, (*c*) sera.

ZELLER (H.). **Die Schutzimpfung gegen Rauschbrand mit Rauschbrand Kulturfiltraten.** [Protective Inoculation against Blackquarter by means of Filtrates.]—*Berlin. Tierärzt. Woch.* 1925. June. Vol. 41. No. 25. pp. 385–387.

The author gives details of protective inoculations carried out during 1924. The cultures used for the preparation of the filtrate were derived from three strains isolated locally. The growths were made in litre flasks containing peptone liver broth with the addition of fragments of liver tissue. The flasks were incubated for three weeks under aerobic conditions, tested for purity, mixed and filtered in succession through wire gauze, paper, asbestos, and Berkefeld candles.

The toxicity of the filtrate was tested by inoculating 1 ox, 2 sheep, 2 rabbits and 18 guineapigs. The ox, which was about 18 months old, was given 100 cc., injected subcutaneously in two places. There was a slight temporary swelling at the seat of inoculation, but there was no rise of temperature, loss of appetite or disturbance of health. The sheep were given 25 and 50 cc. respectively on the inner side of the hind leg. A swelling resulted and the animals were lame for a few days. One of the sheep showed a slight temporary rise of temperature. One rabbit was given 20 cc. subcutaneously and the other the same dose intraperitoneally. Neither showed any disturbance of health.

Seven of the guineapigs were given doses ranging from 1 to 20 cc. subcutaneously, and 5 similar doses intraperitoneally. None died. As doses of 10 cc. or more were likely to produce severe muscular spasms, an alcoholic precipitate was prepared as described by Foth, and this was dissolved in boiled water and injected in doses corresponding to 15, 20, 25, 50, 75 and 100 cc. of filtrate. The two guineapigs which received 75 and 100 cc. equivalent doses died of blackquarter in 24 to 48 hours. The remainder showed only a temporary swelling at the seat of inoculation. Blackquarter bacilli could not be detected culturally in the material used for the inoculations. The 12 guineapigs which had received filtrate subcutaneously in doses up to 20 cc. were injected after the lapse of a month with a dose of freshly isolated culture which proved fatal to 2 controls in 20 and 26 hours. One, which had received 3 cc. of filtrate intraperitoneally, died.

In a second test 16 guineapigs received filtrate, the doses were 1, 2, 3½, and 5 cc., and four guineapigs were injected with each. In

this case two months were allowed to elapse before the test inoculation. The controls died within 48 hours, but all the protected animals survived.

The filtrate thus tested was carbolized to the extent of 0·5 per cent., and distributed for use. The dose used was 5 cc. for cattle irrespective of size and age, and 2,917 doses were used. In no case did untoward results follow the injection, but in a few cases slight transitory swellings were reported. The injections were carried out during April, and up to December, 1924, only four animals had died showing symptoms of blackquarter. In three of these cases the author made bacteriological examinations.

The first case occurred five days after the protective inoculation and presumably before immunity could have been established. There was no evidence that the infection resulted from the inoculation with filtrate.

The second and third cases occurred in calves three months old on the same premises a month after injection of filtrate.

Tests applied to material from Case 2 showed that it was not a case of true blackquarter, the organism isolated belonging to the para-blackquarter group. No specimens were sent for examination from Case 3.

Case 4, in a four-months-old calf, occurred during the fourth month after injection. From this case blackquarter bacilli and para-blackquarter bacilli were isolated.

Uninoculated animals were left on premises where the filtrate was used and four cases of blackquarter were reported among these by the veterinary surgeons. In none of these cases was material sent for bacteriological examination.

The question arose as to whether an attempt should be made to prepare a filtrate which would protect against both blackquarter and para-blackquarter infections. Experiments with guineapigs indicated that while it is a simple matter to protect these against true blackquarter it was found difficult or impossible to protect them against para-blackquarter by means of filtrate. Details of these tests are not given by the author.

PANTON (P. N.) & BENIANS (T. H. C.). **The Influence of the Site of Inoculation upon the Infectivity of Anthrax Bacilli and Pneumococci for Laboratory Animals.**—*Brit. Jl. Exp. Path.* 1925. Aug. Vol. 6. No. 4. pp. 146–157.

The authors' original aim was to attempt to establish BESREDKA'S view that a dose of anthrax bacilli which is fatal by intradermal inoculation is not fatal when injected subcutaneously. Subsequently the work was extended to a comparison of the infectivity of the anthrax bacillus by intradermal and subcutaneous inoculation, and the infectivity of the pneumococcus for mice and rabbits when introduced by the same paths.

Great difficulty was experienced in achieving subcutaneous inoculation without soiling the skin, and the following techniques were employed in attempts to obviate this.

In two instances BESREDKA's technique was employed. A variety of capsules, including capillary glass tubes, were tried but none was quite satisfactory. The use of a double needle with the further modifi-

cation that soft paraffin was forced through the outer one to leave a trail of the substance along the needle track and so imprison the bacilli, was found to be unsatisfactory. Lastly a cannula about 1½ inches long was passed into the subcutaneous tissue secured by stitches and sealed with a stilette. After a few days a long hollow needle was passed through the cannula and the injection made. The stilette was then replaced. Deductions could be drawn from the animals which survived.

The virulence of the anthrax cultures used was frequently ascertained by animal inoculation.

In preliminary experiments it was shown (*a*) that rabbits were susceptible to anthrax by scarification; (*b*) that dead bacilli applied to scarifications produced no immunity; (*c*) that Pasteur vaccines applied by scarification established immunity. In an experiment in which an attempt was made to employ BESREDKA's technique both animals died of anthrax.

An attempt was made to throw light upon the question of the possible soiling of the skin in the process of subcutaneous inoculation by drawing a broth culture through a needle and then without wiping it passing the needle through the skin of three guineapigs and into the marginal vein of a rabbit's ear. Eight animals were treated in this way and only one died. This would appear to indicate that soiling of the skin cannot be responsible for infection which invariably follows subcutaneous inoculation.

Twenty-six rabbits were used in capsule experiments and only one sustained injury from the liberated bacilli. This animal had an accidental cutaneous lesion of the foot.

The authors draw attention to possible fallacies in all capsule experiments.

(1) Deterioration of the culture in the capsule while it is under the skin during the period necessary for the healing of the skin wound. The longer the capsule remains in position the greater the deterioration. "The capsule is lying in an inflamed area, and one might presume, in the case of the rabbit, that the bacteria are exposed to a temperature of approximately 42° C."

(2) The capsule itself has become encapsuled in dense fibrous tissue.

(3) With most types of capsule it is impossible to ascertain what proportion of the dose is expressed. In the case of glass capsules minute fragments may injure the skin.

The occurrence of deterioration in the capsules was established by implanting them under the skin of rabbits and removing them again and examining their contents microscopically, culturally, and by inoculation. Evidence was, however, obtained that in some cases the virulence of the organisms in the capsules was to some extent maintained. Hard and fast conclusions cannot be drawn from capsule experiments, but as a result of a considerable number of experiments the authors are inclined to think that rabbits will tolerate a larger dose of anthrax bacilli placed under the skin than in it.

In cannula experiments, of eight rabbits inoculated four died and four survived. In these cases ·25 to ·5 cc. of virulent culture were introduced into the subcutis. This is regarded as evidence that the subcutis is relatively insusceptible to anthrax.

Some of the rabbits in which capsules had been implanted were used again for similar tests, and finally, along with others in which capsules had been placed once only, were tested by subcutaneous inoculation

with a large dose of virulent culture. Of 19 so treated 16 died as a result of the test inoculation.

The history of one of the survivors was as follows :—

Rabbit 34A ...	May 5th ...	Capsule expressed.
	June 6th ...	½ cc. of contents of buried capsule given subcutaneously.
	Aug. 1st ...	½ cc. virulent anthrax transcutaneously.
	Aug. 11th ...	Inoculated with anthrax by scarification. Slight local reaction.
	Aug. 19th ...	½ cc. of virulent anthrax transcutaneously.
	Aug. 25th ...	Death from generalized anthrax.

The other two had similar histories. From these three animals the authors conclude that a solid immunity both to dermal and transcutaneous injection followed the subcutaneous administration of the bacilli, but that at a period of about 10 days subsequent to the dermal inoculation immunity was lost. "It is possible that these animals were first immunized subcutaneously and subsequently re-sensitized cutaneously, but at present the evidence only justifies the statement that the lethal dose was effective after dermal inoculation, and we do not know what part, if any, this dermal inoculation played. The four rabbits which survived cannula inoculation were given lethal doses transcutaneously at intervals ranging from 9 days to 10 weeks afterwards. Three died in about the same period as controls and the fourth died on the 12th day. There was no local oedema, but very occasional bacilli were present in the heart blood.

BROCQ-ROUSSEU & URBAIN (Ach.). **Cuti-vaccination et cuti-immunité anticharbonneuse chez le cobaye.** [Cuti-Vaccination and Cuti-Immunity of the Guineapig against Anthrax.]—*Compt. Rend. Soc. Biol.* 1925. July 10. Vol. 93. No. 24. pp. 333–335.

The authors record in this paper the results of experiments designed to test the resistance of guineapigs immunized against anthrax by the cutaneous path to intracerebral inoculation, and they come to the conclusion that the immunity conferred by cuti-vaccination is sufficiently strong to permit the vaccinated guineapigs to resist intracerebral inoculation with several fatal doses of virus.

SCHOENFELD (A. F.) & CARPENTER (C. M.). **Mixed Infection in Guinea-Pigs with** *Bacterium abortum* **and** *Mycobacterium tuberculosis*.—*Jl. Infect. Dis.* 1925. July. Vol. 37. No. 1. pp. 68–74.

In the course of experiments in which guineapigs have been inoculated with materials suspected of containing the abortion bacillus it has occasionally happened that tuberculosis has been produced, although there was no reason for supposing that the material used for inoculation contained tubercle bacilli. The lesions produced by the two organisms resemble each other both macroscopically and microscopically. It therefore appeared to be of importance to ascertain whether specific agglutinins would be developed for the bacillus of abortion in cases of mixed infection. A series of groups of guineapigs were inoculated with the two organisms simultaneously, and one after the other, and also with extracts of the lesions produced by the organisms. The inoculations did not interfere with the development of agglutinins in any instance.

DESCOMBEY (P.). **Vaccination du cheval par l'anatoxine tétanique.** [The Vaccination of Horses by Tetanus Anatoxin.]—*Ann. Inst. Pasteur.* 1925. June. Vol. 39. No. 6. pp. 485-504.

Tetanus toxin may be rendered non-toxic by the addition of formalin in the proportion of 2 per 1,000, the mixture being incubated at body temperature. The toxic power is gradually lost until after about 20 days. Doses of 10 cc. may be injected into guineapigs without producing any immediate or delayed reaction. A decrease in the amount of formalin added leads to a slower destruction of toxic power and *vice versa*, but too great quantities of formalin are to be avoided because of their reducing the antigenic power of the anatoxin.

The anatoxin produced by formolization of the toxin has considerable immunizing powers. A dose of 0·1 cc. of anatoxin is sufficient to protect a guineapig against 10 lethal doses of toxin after an interval of 16 days. Twenty lethal doses will cause local tetanus, but no fatal result. Anatoxin is capable of producing flocculation with anti-tetanic serum, and it appears to be established that anatoxins which give flocculation with anti-tetanic sera in short periods are more actively antigenic than those which require a longer time for flocculation. Flocculation is therefore an index of antigenic power. Anatoxin can be preserved at room temperature, or in an ice chest for months without deterioration.

Experiments have been carried out with anatoxin on horses as follows :—

Two horses were given 20, 20, and 30 cc. of anatoxin at intervals of a week, and after a further interval of the same duration they received 2 cc. of tetanus toxin. This toxin was that in general use for immunization purposes at the Pasteur Institute and the dose given represented several dozen fatal doses for an unprotected horse.

Five horses received two doses of 20 cc. of anatoxin at a week's interval, followed by a dose of 1 cc. of toxin. In one case the interval was a week and in the other four a fortnight after the second dose.

Three horses were given 15 and 20 cc. at a week's interval followed by a dose of 1 cc. a week later. None showed any symptoms whatsoever and they were subsequently given progressively increasing doses of toxin for hyperimmunization.

With a view to testing the immunity conferred by anatoxin in a manner resembling natural infection, splinters of wood were soaked in sporulating cultures, then heated in a water bath to 80° C. for half an hour, and then immersed in a mixture of cultures of staphylococci, bacillus pyocyaneus, and Friedlander's bacillus. Such splinters always set up fatal infections in guineapigs. In the experiments with horses these splinters were planted deeply in the muscles of the neck by passing them through a bleeding cannula and thrusting them deep into the muscles. Two horses were treated in this way, and in the case of 4 others the splinters were saturated with a solution of a salt of quinine.

Horse 1 was given two doses of 20 cc. of anatoxin at a fortnight's interval, and No. 2 was given two doses of 10 cc. at the same interval. Ten days later the infected splinters were inserted into the muscles. A control horse, uninjected with anatoxin, had a splinter inserted at the same time. The control developed tetanus a fortnight later and died. The protected animals showed no symptoms.

Horse No. 3 received doses of anatoxin as No. 2. Nos. 4 and 5 received a single dose of 10 cc., and No. 6 a single dose of 20 cc. From

4 to 4½ months later the infected splinters saturated with quinine were inserted. A control was used. The control died of tetanus on the 15th day after 2 days' illness. Horse No. 5 died on the 17th day after 3 days' illness. No. 6 developed symptoms on the 14th day and died 15 days later. Nos. 3 and 4 developed no symptoms.

The methods employed in the foregoing experiments excluded the possibility of ascertaining certain important points regarding the immunity conferred by anatoxin since animals which died under test inoculation were lost, and in those which survived the immunity was reinforced by the test inoculation.

Steps were therefore taken to ascertain whether the injection of anatoxin caused the production of antibodies in the serum. Experiments with guineapigs showed that animals immunized with 0·1 cc. of anatoxin furnished a serum two months later, 0·5 cc. of which completely neutralized *in vitro* two lethal doses of toxin. In experiments with horses serum was obtained from Nos. 3, 4, 5, and 6 mentioned above prior to the insertion of the infected splinters. These sera were titrated against toxin by means of guineapig inoculation with mixtures of serum and toxin, and the existence of antitoxin in the sera of the horses was established. The results were parallel with the infected splinter tests. They showed that double inoculation with anatoxin was more effective than single inoculation. The experiments also showed that this method of testing immunity was superior to others.

With a view to the determination of the amount of anatoxin necessary for the production of antitoxin a number of horses were injected with doses ranging from 15 to 5 cc. Six horses received one injection only, but three were given two doses of 5 cc. at three weeks' interval.

When the sera of these animals were tested those which had received two doses of 5 cc. were found to contain larger amounts of antitoxin than the sera of any of the animals which had one dose only. These results of course only apply to the particular anatoxin used, and it is reasonable to suppose that had the anatoxin been prepared from a more toxic sample of toxin smaller doses might prove protective.

The author has not been able to reduce the period required for the production of antitoxin in the serum to less than 15 days, although large doses (up to 300 cc.) of anatoxin have been injected. The antitoxin is produced slowly and it increases in amount for some weeks after its appearance in the serum can be detected.

Sufficient time has not yet elapsed to allow any opinion being formed regarding the duration of immunity produced by anatoxin, but the facts so far ascertained indicate that it persists for several months.

BROCQ-ROUSSEU & URBAIN. **La Vaccination contre la toxine du Bacille de Preisz-Nocard.** [Vaccination against the Toxin of the Preisz-Nocard Bacillus.]—*Compt. Rend. Soc. Biol.* 1925. July 24. Vol. 93. No. 26. pp. 486–487.

The Preisz-Nocard bacillus was grown in Martin's broth for 10 days and the culture was then filtered through a Chamberland L3 filter. One cubic centimetre of such a toxin injected subcutaneously killed a guineapig in 36 hours.

Such toxin had formalin added to it in the proportion of 3 per 1,000, and was incubated. After 4 days the toxin failed to kill a guineapig

in a dose of 5 cc., while non-formolized toxin incubated for the same period proved fatal in a dose of 4 cc. After incubation for 8 days the non-formolized toxin became non-toxic.

With a view to the investigation of the antigenic values of formolized and non-formolized toxin, the mixtures were incubated for a month, but it was found that formolized toxin was not superior to heated toxin and that both were only feebly antigenic.

NARAYANAN (R. S.). **A Case of Tuberculosis in an Elephant.**—*Jl. Comp. Path. & Therap.* 1925. June. Vol. 38. Pt. 2. pp. 96–97.

A female elephant about 70 years of age was noticed to be losing condition in March 1923. The appetite was capricious, the urine cloudy, and the faeces were softer than normal and often coated with mucus.

Death took place just a year later. Prior to this there had been marked emaciation, foetid diarrhoea with an admixture of blood, and oedema of dependent parts.

At the post-mortem examination the liver and spleen were found to be enlarged. The mucous membrane of the large intestine was thickened and dark red in colour. On the wall of the large bowel there were three lesions as large as a fist and containing greyish-white matter. Both lungs were involved and showed caseo-calcareous lesions.

Examination of specimens by EDWARDS showed that the lung lesions were tuberculous. The intestinal lesion was apparently due to parasitic invasion.

GREEN (R. G.). **Distemper in the Silver Fox** (*Culpes vulpes*).—*Proc. Soc. Exp. Biol. & Med.* 1925. May. Vol. 22. pp. 546–548.

The author has obtained a bacillus belonging to the Salmonella group from silver foxes dying with symptoms of distemper. To get rid of the large number of contaminants encountered in natural cases, materials obtained from diseased animals were passed through others in series, and from the last of these cultures were obtained and the disease was carried on by culture inoculations in series also.

The lesions mainly involved the liver, which was congested, and the intestine, which showed ulceration. Catarrh of the air passages and pneumonia were not encountered in the experimental infections. The heart blood and the central nervous system proved infective.

DISEASES DUE TO FILTERABLE VIRUSES.

WRIGHT (L. H.). **Further Investigations of Infectious Equine Anaemia in Nevada.**—*Jl. Agric. Res.* 1925. Apr. 1. Vol. 30. No. 7. pp. 683–691. With 12 charts in text.

The author is of the opinion that the presence or absence of eosinophilia is not a reliable guide for the differential diagnosis of infectious anaemia and strongylosis. The only definite means of diagnosis is the reproduction of the disease in an experimental animal, but a blood count and a temperature curve may assist very materially.

The filtrability of the virus is confirmed.

NÖLLER (W.) & DOBBERSTEIN (J.). **Zur Frage der histologischen Diagnose der ansteckenden Blutarmut der Pferde.** [The Histological Diagnosis of Infectious Anaemia of Equines.]—*Berlin. Tierärzt. Woch.* 1925. July 24. Vol. 41. No. 30. pp. 465–472.

The authors classify their findings into six groups which are characterized as follows :—

Group 1.—The endothelial cells of the reticulum in the liver are neither swollen nor increased in number. They contain little or no haemosiderin.

Group 2.—The endothelial cells of the reticulum of the liver are enlarged and often slightly increased in numbers. They contain a variable amount of haemosiderin. Lymphoid cells as well as endothelial cells may be found in the capillaries. Glisson's tissue often shows an increase in the lymphocyte-like cells. The spleen as a rule contains a normal amount of blood and haemosiderin, but cases occur in which there may be an abnormally small or an abnormally large amount of haemosiderin in the spleen. Very frequently large numbers of eosinophile cells were found round the periphery of the follicles.

Group 3.—The endothelial cells are obviously enlarged and are present in increased numbers. They almost invariably contain large amounts of haemosiderin. The affected capillaries appear as solid strings of cells. The spleen frequently contains an excess of haemosiderin.

Group 4.—The endothelial cells show a tendency to collect into masses. These masses sometimes contain an admixture of lymphocytes. There is a marked excess of haemosiderin. The spleen shows a marked reduction in its blood- and haemosiderin-content. The aggregation of eosinophiles round the follicles is very inconspicuous. There is a marked multiplication of the lymphocyte elements in the spleen.

Group 5.—The capillaries become distended with endothelial cells and the masses produced present the appearance of small tumours. In the spleen the follicles are not distinct as a result of the multiplication of the lymphoid cells. Eosinophile cells are practically absent.

Group 6.—Is characterized by the more or less complete destruction of the centres of the liver lobules, the place of the liver cells being taken by endothelial cells containing large amounts of haemosiderin. In the spleen only traces of haemosiderin are found, and there is increased multiplication of lymphocytes.

The lesions found in Groups 1 and 2 do not definitely indicate the existence of infectious anaemia. The lesions of Group 3 indicate its probable existence, while in Groups 4, 5 and 6 are included cases in which the diagnosis is practically certain.

As the result of their examination of 700 cases in which the existence of the disease was suspected, the following conclusions have been arrived at :—

In 37 per cent. of cases the histological examination indicated that the disease was "probably" or "very probably" present.

The histological changes are the more pronounced according as the animal has had febrile attacks during the weeks preceding death or slaughter. Where fever has not occurred, changes are inconspicuous.

The lesions observed are not absolutely specific, as they occur in such diseases as piroplasmosis and dourine, and are probably to be found in all diseases in which phagocytosis of red corpuscles occurs.

The histological examination is in fact only one part of the general examination, including the history of the case and the post-mortem findings, upon which it is at the moment possible to base a diagnosis of infectious anaemia.

ABE (T.). **Über das Virus der Maul- und Klauenseuche.** [The Virus of Foot-and-Mouth Disease.]—*Zeitschr. f. Infektionskr. parasit. Krankh. u. Hyg. d. Haust.* 1925. June 30. Vol. 28. No. 2. pp. 111–129.

The author has studied the effect of various physical and chemical influences upon the virus of foot-and-mouth disease.

The lymph in the vesicles on the feet of infected guineapigs reaches its maximum virulence in 24 hours, maintains that maximum for a further 24 hours and then declines.

The virus can be precipitated along with albumen by 70 to 75 per cent. alcohol. The dried precipitated virus maintains its virulence for 2–3 days, and in glycerin for 10 days.

Dried virus which has become avirulent is useless for immunization. The virus is not sedimented by centrifuging at 2,000 revolutions. It is absorbed by kaolin, and still better by animal charcoal.

Berkefeld filters allow the virus to pass, but the proportion of the virus passing is dependent upon the pressure. Haen's membrane filters hold varying proportions of the virus back.

The inoculation of rabbits causes the production of antibodies in the serum.

WEISCHER, STAPENHORST & BÜRMANN. **Der Dortmunder Impfapparat für Maul- und Klauenseuche.** [The Dortmund Apparatus for Injection of Foot-and-Mouth Disease Serum.]—*Berlin. Tierärzt. Woch.* 1925. Sept. 18. Vol. 41. No. 38. pp. 613–614. With 1 text fig.

The authors describe a special form of container to which a pump supplied with a rubber tube and cannula can be fixed.

VAN HEELSBERGEN (T.). **Die Impfung gegen Diphtherie und Geflügel pocken mit "Antidiphtherin."** [Inoculation against Fowl Diphtheria and Fowl Pox with "Antidiphtherin."]—*Schweiz. Arch. f. Tierheilk.* 1925. July 15. Vol. 67. No. 13. pp. 333–338.

There is now a considerable amount of evidence to show that fowl diphtheria and fowl pox are caused by one and the same virus.

Both give fully virulent virus, and viruses modified in various ways have been employed for immunizing purposes.

The author states that he has been able to obtain an unmodified virus which confers immunity by intradermal inoculation with the production of a local reaction only. No details are given.

FRANÇA (C.). **Pathologie comparée de la rage.** [The Comparative Pathology of Rabies.]—*Arch. Inst. Pasteur Tunis.* 1925. July. Vol. 14. No. 3. pp. 309–324.

In this paper the author publishes a summary of his observations in connexion with rabies in a number of different species.

One of his main objects has been to ascertain which is the most important and the most constant of the various alterations found in the histology of certain parts of the nervous system. A further aim has been to establish the nature of the cells found in certain of these nerve lesions. For example, a leucotoxic serum was found to produce great changes in the cells which are sometimes found within the capsules of the ganglion cells, and it was further found that the use of such a serum produced a great improvement in the general condition of the animal. The author's investigations have included man, carnivora, rodents, and the hedgehog.

In the human subject it has been found that the cerebro-spinal fluid is virulent, and in one case the virus contained in that liquid was proved by experimental inoculation to be fixed virus. Summaries are given of the author's findings regarding lesions in the nervous systems in the wolf, fox, marten, weasel, badger, mice and rats, porcupine, and hedgehog.

He finds that rabies is the most constant in its symptoms and lesions in man and the carnivora. The typical lesions are generally all present, but they are most marked in the Canidae.

In rodents lesions of the ganglia are usually absent, and in insectivors the lesions are very inconstant.

As a result of the histological examination of all the material available the author concludes that the most constant lesion is the hypertrophy of the neuro-fibrils, and following this he found the perivascular infiltrations the most common. The lesions of Nelis and van Gehuchten, which are so typical of rabies in man and carnivora, are not found in the rodents and hedgehog.

He is unable to express any opinion as to the constancy or otherwise of Negri bodies as they have not been searched for in all the material.

GALEEGO (A.). **Beitrag zur histologischen Diagnose der Tollwut.** [The Histological Diagnosis of Rabies.]—*Zeitsch. f. Infektionskrankh. parasit. Krankh. u. Hyg. d. Haust.* 1925. June 30. Vol. 28. No. 2. pp. 95–98.

In this paper the author describes a method for staining Negri bodies in sections which he claims is rapid, simple and effective :—

Small pieces of Ammon's horn are fixed by boiling in 10 per cent. formalin for 1 to 5 minutes.

Frozen sections are cut. The sections are placed for ½ to 1 minute in

Distilled water	10 cc.
Nitric acid	1 drop.
Liq. ferri. perchlor.	1 drop.

Without washing, the sections are transferred to

Distilled water	10 cc.
Carbol Fuchsin	15 drops.
Acetic Acid	1 drop.

Rinse in water, and transfer for 5 minutes to

Distilled water	10 cc.
Formalin	11 drops.
Nitric Acid	1 drop.
Liquor ferri perchlor.	1 drop.

Rinse in water and stain for 1 minute in

1 per cent. watery solution of Indigo-carmine	1 part.
Saturated watery solution of Picric Acid ...	2 parts.

The specimen is then dehydrated and clarified and mounted in Canada balsam.

The cell nuclei are violet, the protoplasm light green, the body of the Negri bodies is dark green and the inner bodies are pale violet or unstained.

SCHOENING (H. W.). **Studies on the Single-Injection Method of Vaccination as a Prophylactic against Rabies in Dogs.**—*Jl. Agric. Research.* 1925. Mar. 1. Vol. 30. No. 5. pp. 431–439.

As a result of experiments carried out with single vaccines prepared at the Laboratory of the Bureau of Animal Industry, supplied by commercial houses, and prepared according to the technique of UMENO and DOI, the author came to the conclusion that there appears to be more than one strain of street rabies in the United States.

STOCKMAN (S.). **A Review of Some Problems of Foot-and-Mouth Disease.**—*Proc. Roy. Soc. Med.* (Section of Comp. Med.). 1925. Aug. Vol. 18. No. 10. pp. 31–39.

MYCOTIC DISEASES.

LANGERON (M.), CAUCHEMEZ (L.) & ALLEAUX (V.). **Cultures de massues obtenues dans trois cas d'actinobacillose bovine.** [Cultures containing Clubs from Three Cases of Bovine Actinobacillosis.]—*Ann. Parasit. Hum. et Comp.* 1925. July. Vol. 3. No. 3. pp. 225–231. With 4 text figs.

The literature shows that the development of clubs in artificial cultures of the Actinobacillus is an exceptional result, but it appears to be associated with the presence of substances derived from the body (blood, serum, etc.). From a case of actinobacillosis of the peritoneum, the animal also showing lesions of the tongue, cultures were made on Sabouraud's medium and incubated at 26° C. Colonies appeared in about a fortnight, and developed very slowly. At first they were yellowish, but they gradually changed to brown, and then chocolate. Microscopic examination showed that they were a mass of clubs.

Subcultures on other media kept at 26° C. succeeded. Martin's agar, carrot, and ordinary agar were all used. On potato growth was very slow. No cultures were obtained in liquid media. Stab cultures in agar failed, and no growth was obtained at 37° C.

After 4 or 5 subcultivations the development of clubs ceased and the " cultures were invaded " by a gram-negative diplococcus.

In a second case of actinobacillosis of the tongue cultures with numerous clubs were obtained on media containing glucose by the 4th day. Subcultures were obtained on peptone agar, but not on ascites agar, carrot or potato. The structure of the colonies was examined in preparations of entire colonies in lacto-phenol, in sections of colonies fixed in Bouin and embedded in paraffin. The best stain for sections was found to be Curtis' method (Safranin-picro-black-naphthol). The authors view the clubs as living protoplasmic structures which are capable of budding, but the view that their formation is in some way connected with the opposition of the tissues cannot be maintained.

The organism which gave rise to these cultures differs in certain particulars from that described by LIGNIÈRES and SPITZ. It does not grow at all at 37° C. It is aerobic, it will grow on potato which has not been rendered alkaline, and it grows on carrot which is essentially

an acid medium. In view of the findings of other investigators it appears to be justifiable to conclude that there is more than one type of actinobacillosis.

GILMAN (H. L.) & BIRCH (R. R.). **A Mould Associated with Abortion in Cattle.**—*Cornell Vet.* 1925. Apr. Vol. 15. No. 2. pp. 81–89. With 2 plates.

The authors report the recovery of a mould of the genus Mucor from the foetuses which were aborted in one herd. The three abortions were spread over a period of three years. Experimental inoculations of five pregnant cows with cultures of the mould led to placental infection without abortion in one, and placental infection with abortion in another. The mould was recovered in a state of purity from both. The remaining three animals yielded negative results. The herd gave negative results to agglutination tests with the abortion bacillus. The mould and the lesions produced were practically identical with those described by SMITH in 1920.

Y MARTIN (C. A.). **Contribucion al estudio de la linfangitis epizootica.** [Epizootic Lymphangitis.]—*Revist. Hig. y Sanidad Pecuarias.* 1925. May-June. Vol. 15. No. 5–6. pp. 291–301.

MISCELLANEOUS.

GEISERT (E.). **Zur Therapie der Bornaschen Krankheit, erfolglos Behandlung mit Hexamethylen-tetramin. Urotropin.** [Urotropin used without Success in the Treatment of Borna Disease.]—*Berlin. Tierärzt. Woch.* 1925. Sept. 4. Vol. 41. No. 36. p. 586.

The author has used the drug on five cases, in doses varying from 20 to 140 gm., but without success.

HIESINGER (F.). **Zur Spirochätenfrage bei der Stuttgarter Hundeseuche.** [Spirochaetes and Stuttgart Disease.]—*Berlin. Tierärzt. Woch.* 1925. July 31. Vol. 41. No. 31. pp. 381–383. With 2 text figs.

The author has investigated 20 cases of Stuttgart disease and in one case only, in which putrefaction had already set in, were spirochaetes found in the kidney. Transmission to the rabbit failed.

In no case were the structures described by LUKES as spirochaetes found in the kidneys.

In 3 out of 13 control dogs LUKES' spirochaetes were found in the kidneys. In one case, in addition to putrefactive bacteria and LUKES' spirochaetes, undoubted spirochaetes were found in Levaditi preparations.

LEGER (A.). **Mode de préparation simplifié d'un éosinate de méthylène.** [A Simple Method of preparing Eosinate of Methylene.]—*Bull. Soc. Path. Exot.* 1925. June 10. Vol. 18. No. 6. pp. 464–465.

Working in Annam the author has devised a simple method of preparing an eosinate of methylene blue with dyes of French origin

(R.A.L.) which is said to give very good, selective and intense staining with blood corpuscles and blood parasites.

Grind in a mortar 1 part of eosin extra R.A.L. with 2 parts of methylene blue R.A.L.

To 1 gramme of the mixture add 2 cc. of neutral glycerin and thoroughly grind. Add 100 cc. of absolute methyl alcohol. Shake and filter.

Ten or twelve drops of this stain are placed on a dry but unfixed film and allowed to act for one or two minutes. Add an equal amount of distilled or tap water and allow the mixture to act for 5–10 minutes.

Wash and dry.

ELLIOT (H. B.). **The Veterinary History of the Island of Hawaii.**—*Vet. Jl.* 1925. July. Vol. 81. No. 7. pp. 335–346.

After dealing briefly with the early history of the islands, climate, and animal population (the figures for the latter are admittedly inaccurate), the writer proceeds to deal with animal diseases.

It is stated that all the contagious diseases now present in the Islands have been imported from the continent of America.

The diseases affecting equines are glanders, influenza, cerebro-spinal meningitis, epizootic lymphangitis, tetanus, osteoporosis, parasitic infestations, and diseases of the digestive tract.

The first of these, which alone for a time took heavy toll, is now thought to have been eradicated. Mention is made of the occurrence of what appears to have been a mild form of glanders in indigenous animals, a form which did not spread to mules by contact, and it is stated that ONISSIMENKO, working on the Island of Maui, believes that he has discovered in a district that was severely infected with glanders many years ago an attenuated type of bacillus.

Under influenza are included nasal catarrh, strangles, and contagious pneumonia. The detention of animals for three weeks' quarantine and sanitary measures in general have greatly reduced losses from these diseases during recent years. NORGAARD originally believed that epizootic lymphangitis was existent in the island, but Elliot has not seen a typical case. Tetanus occasionally occurs, but the percentage of recoveries is unexpectedly high.

Osteoporosis was for years a very serious matter in the wet districts, but it has not been known for many years now, the decline in the number of cases beginning in 1904. It is difficult to offer a sound hypothesis for this, but it would seem to be associated with improved dietary. This is supported by the fact that the disease abruptly disappeared from a stable previously ravaged by it when bran feeding was stopped.

Cerebro-spinal meningitis is occasionally seen in Hawaii, but is of more common occurrence in other islands of the group. Summer sores are of frequent occurrence. At one time there were large numbers of animals to which the term "blower" was applied. They were so-called because after return from work they would stand for hours, with food untouched, blowing heavily. Such animals were usually in good condition, had staring coats, and never sweated at work. The most dangerous period was when the winter coat was being acquired. "Blowers" working at such times often died from pul-

monary congestion. The universal adoption of the practice of periodical clipping has eliminated this source of loss.

Tuberculosis exists among the cattle on the Island. In 1906 a certificate was required prior to shipment, but this was found to be ineffective for stopping the importation of infected animals. A period of quarantine and retest are necessary.

In 1910, a test of the dairy cattle on the Island of Oahu showed 23·49 per cent. reactors. An initial test on the island of Hawaii in 1914 eliminated 7·7 of diseased animals. The subcutaneous test is impracticable, and the intrapalpebral test is employed.

Various methods of compensation have been put into force in connection with compulsory slaughter, but complete eradication has not been achieved. The percentages for Oahu and Hawaii last year were 3·4 and 1·3 respectively. In Honolulu Abattoir tuberculous lesions are found in about 4 per cent. of beef cattle and 2 per cent. of pigs.

With the importation of pure bred animals for improving breeds there was introduced contagious abortion. This disease was first referred to in reports in 1920, and it is stated now that all the pure-bred and many of the grade herds on Kauai, Oahu, and Maui are infected. In Hawaii it is known to exist in one isolated herd only.

In the past confusion has arisen between haemorrhagic septicaemia and blackquarter, but apparently both diseases exist, and are almost every year responsible for sudden outbreaks with a high mortality. It is said that cases of blackquarter occur in cattle of all ages, and that death occurs without any development of a muscle lesion. At altitudes of 3,000–4,000 feet a form of haematuria associated with ulceration of the bladder occurs. This in other parts of the north-western Pacific region is attributed to an excess of oxalic acid in certain plants.

The smaller domesticated animals are said to be largely free from disease.

SEDDON (H. R.) & CARNE (H. R.). *Marsdenia rostrata*: **A Vine Poisonous to Stock.**—*Dept. of Agric. New South Wales Vet. Res. Rep.* No. 1. 1925. Apr. pp. 34–43.

Reports having been received that fatalities had occurred both in cattle and pigs which were possibly due to the ingestion of this plant, experiments were undertaken to test its toxicity.

In experiments it was found that the plant was toxic for cattle, sheep and pigs. Cattle and sheep would not eat the plant either alone or when mixed with other foods, but pigs would do so as a mixture. It appears to be probable that the milky latex which the plant contains renders it unpalatable. Pigs would take a watery extract when mixed with a considerable amount of milk. The experiments performed appear to indicate that the toxic principle acts upon the nervous system.

In pigs symptoms appear within an hour or two of drinking extract. These are unsteadiness of gait, loss of equilibrium, inability to stand, acceleration of pulse and respirations, vomiting, dilatation of the pupils, and, just prior to death, coma. Death usually supervenes within two or three hours after drinking the extract.

Cattle and sheep which were drenched with extract did not show symptoms for some hours. When they appeared they closely resembled those seen in pigs, and death occurred in 24 to 48 hours.

In one sheep, which developed symptoms of intoxication, recovery occurred, and was complete by the third day.

In pigs post-mortem examination revealed the following lesions. The blood was dark and uncoagulated. The stomach and intestines showed diffuse or patchy submucous haemorrhages. These were most marked in the stomach, ileum, and caecum. There was no blood in the lumen of the bowel.

In one case a post-mortem was made on a 16-months-old calf, and the lesions found were similar to those seen in the pigs. The post-mortem examinations of the fatal intoxications in sheep revealed similar lesions.

The leaves of the plants were found to be toxic, whether fresh or dried, but other parts of the plant have not been tested.

The minimum toxic doses have not been ascertained, but the following produced toxic effects. In weaned pigs a cold watery extract of sources of green leaves, in sheep extract of 6 ounces of green leaves, and 2-year-old cattle extract of 1½ lb.

The toxic principle has not as yet been isolated, but preliminary tests have revealed the presence of an alkaloid.

SEDDON (H. R.) & CARNE (H. R.). **Poisoning of Stock by** *Solanum sturtianum.*—*Dept. of Agric. New South Wales Vet. Res. Rep.* No. 1. 1925. Apr. pp. 28–33.

It would appear that the toxic properties of this plant have not as yet been investigated, although experiments have been conducted with *S. esuriale.* Brief details are given of three occasions when heavy mortalities occurred among sheep and cattle passing through country where the plant is plentiful. It is said that cattle grazing continuously in the neighbourhood of Broken Hill, where the plant is abundant, are not affected, but mortalities occur among fresh stock and among travelling stock.

A stock of ripe berries were obtained for experiment from Broken Hill and these were identified as the fruit of *Solanum sturtianum.*

In the first experiment it was found that the sheep would not eat the berries, a watery extract was therefore made from 1 lb. of berries, and the extract made up to 1 litre. A drench of water followed the administration of the extract. Within 4 hours six motions had been passed, these becoming progressively more diarrhoeic. The diarrhoea continued and there was laboured respiration and frothing at the mouth. The diarrhoea continued, and death occurred at 47 hours. At the post-mortem severe gastro-enteritis was found.

The experiment was repeated on a heifer with a total of 1½ lb. of berries extracted with 8 litres of water. Diarrhoea was again produced and this persisted for three days, when the animal was killed.

In a third experiment another heifer ate a quantity of berries (about 3 lb.) minced up with chaff and bran. Diarrhoea began in about 36 hours and death took place at the 72nd hour.

At the post-mortem severe gastro-enteritis and peritonitis were found.

The toxic principle has not been identified up to the present.

SEDDON (H. R.). *Stachys arvensis*: **A Cause of Staggers or Shivers in Sheep.**—*Dept. Agric. New South Wales Vet. Res. Rep.* No. 1. 1925. Apr. pp. 14–27.

Proof has already been furnished by DODD and HENRY that *Malva parviflora* and *Lamium amplexicaule* are both capable of producing the disease in sheep. Seddon now brings evidence to incriminate *Stachys arvensis*, previous tests having been inconclusive.

In the first experiments three sheep were given 30 lb. of freshly-cut plant daily, and they were tested by driving, along with control sheep The first drive was on the 12th day. Evidence was obtained that, 12 days feeding may be sufficient to provoke symptoms, and that whether staggering develops or not, driving such sheep may prove fatal.

A further sheep fed later did not develop symptoms even up to 5 weeks. It is suggested that the different age of the plant may have accounted for this difference in result.

In the second experiment the cut plant was transported 73 miles before being fed to the sheep.

Definite symptoms of lagging behind and falling were seen in the fed ewes and lambs beginning on the 8th day after feeding. None of the control sheep showed symptoms.

It was found by experiment that substitution of good diet for the weed lead to prompt recovery. The minimum amount of plants necessary to produce symptoms in lambs was about 6 lb., and in sheep about 11 lb., each fed during a period of 4½ days.

The substance responsible for the symptoms is excreted in the ewe's milk, as was shown by an experiment. The ewe which ate from 1 to 6 lbs. daily first showed symptoms when driven on the 12th day. Both ewe and lamb showed staggering and frequent urination, another symptom of the intoxication, on the 24th day.

BAKER (A. H.). **A Useful Preservative for Whole Blood.**—*Brit. Jl. Exp. Path.* 1925. Aug. Vol. 6. No. 4. pp. 201–202.

After a number of tests with other substances it was found that boric acid in the proportion of 1/100 to 1/500 was suitable for the preservation of samples of fowls blood collected for agglutination tests with *B. pullorum*. Tubes of 2·5 cc. capacity were sent out with 0·1 cc. of 5 per cent. solution of boric acid in saline. If the tube was filled with blood the dilution of the boric acid was 1/500.

Serum separation was good; no haemolysis occurred until the 4th day or later. No cloudiness due to contamination was visible till the 6th day, and the agglutination titre remained constant.

In a postscript the author states that it is probable that a similarly simple method has been used elsewhere, but that he has not been able to find any reference to it. The use of boric acid in saline for the preservation of blood has already been recommended by BEVAN [see this *Bulletin*, 1916, Vol. 4, No. 1, p. 40].

HAGAN (W. A.). **Bracken Poisoning in Cattle.**—*Cornell. Vet.* 1925. July. Vol. 15. No. 3. pp. 326–332.

INDEX OF AUTHORS.

T

U

V

W

Y

Z

INDEX OF SUBJECTS.*

Compiled by MISS M. H. JAMES.

Note.—Incidence, Treatment, &c., are indexed only under Diseases, and not under Animals affected by the Diseases.

* The numbers in heavy type refer to the titles of papers summarized.

pp. 115–147.] [November 30, 1925.

TROPICAL VETERINARY BULLETIN

Vol. 13. 1925. No. 4.

ISSUED UNDER
THE DIRECTION OF THE
HONORARY MANAGING COMMITTEE
of the
TROPICAL DISEASES
BUREAU.

General Editor:
THE DIRECTOR OF THE BUREAU.

London:
TROPICAL DISEASES BUREAU.
23, Endsleigh Gardens, W.C. 1.

Price 3s. 6d net.] *Entered as Second Class Matter in the U.S. Post.*

HONORARY MANAGING COMMITTEE.

Dr. Andrew Balfour, C.B., C.M.G.

Major-General Sir David Bruce, K.C.B., F.R.S.

Major-General Sir R. Havelock Charles, I.M.S., G.C.V.O., K.C.S.I.

Sir Walter M. Fletcher, K.B.E., M.D., D.Sc., F.R.S.
(representing the Medical Research Council).

Dr. A. E. Horn, C.M.G.

Lieut.-General Sir William B. Leishman, K.C.M.G., C.B. F.R.S., K.H.P.

Sir John M'Fadyean, M.R.C.V.S.

Sir S. Stockman, M.R.C.V.S.

Mr. P. B. B. Nichols, *M.C.*
(representing the Foreign Office)

with

Mr. J. B. Sidebotham,
of the Colonial Office, as Secretary.

Director:
A. G. Bagshawe, C.M.G., M.B., D.P.H. Cantab.,
of the Uganda Medical Staff.

Assistant Director:
J. F. C. Haslam, *M.C.*, M.D., D.P.H., M.R.C.P.E.

Secretary and Librarian:
R. L. Sheppard.

Editor of the
Tropical Veterinary Bulletin:
A. Leslie Sheather, D.Sc., M.R.C.V.S.

REPRINTS AND PAMPHLETS RECEIVED.

BERG (Hugo). Die Eignung von " Bayer 205 " zur Bekämpfung der afrikanischen Haustiertrypanosomen.—*Deut. Tierärzt. Woch.* 1925. Vol. 33. No. 34. pp. 561–571. With 10 text figs.

BRUG (S. L.), den HEYER (J. K.) & HAGA (J.). Toxoplasmose du lapin aux Indes Orientales Néerlandaises.—*Ann. Parasit. Humaine et Comparée.* 1925. July. Vol. 3. No. 3. pp. 232–238. With 33 figs. on 6 plates.

CAMERON (A. E.). Studies on the Bionomics of Mange Mites of Cattle.—*Parasitology.* 1925. Aug. 28. Vol. 17. No. 3. pp. 278–283.

CAMERON (Thomas W. M.). Parasitic Diseases of Pigs and their Prevention.—*Jl. Ministry Agric.* 1925. Aug. Vol. 32. No. 5. pp. 424–431.

——. Some Recent Advances in Veterinary Helminthology.—*Nat. Vet. Med. Assoc. of Gt. Britain & Ireland. Annual Report, 1925.* pp. 161–183.

COWDRY (E. V.). A Group of Microorganisms transmitted hereditarily in Ticks and apparently Unassociated with Disease.—*Jl. Experim. Med.* 1925. June 1. Vol. 41. No. 6. pp. 817–830. With 3 plates.

——. Studies on the Etiology of Heartwater. I. Observation of a Rickettsia, *Rickettsia ruminantium* (N.Sp.), in the Tissues of Infected Animals.—*Ibid.* Aug. 1. Vol. 42. No. 2. pp. 231–252. With 2 plates.

——. Studies on the Etiology of Heartwater. II. *Rickettsia ruminantium* (N.Sp.) in the Tissues of Ticks transmitting the Disease.—*Ibid.* pp. 253–274. With 2 plates.

——. The Occurrence of *Rickettsia*-Like Microörganisms in Adult " Locusts " (*Tibicen septendecim* Linn.).—*Biol. Bull.* 1925. Jan. Vol. 48. No. 1. pp. 15–18. With 1 plate.

——. Studies on the Etiology of Jagziekte. I. The Primary Lesions.—*Jl. Experim. Med.* 1925. Sept. 1. Vol. 42. No. 3. pp. 323–333. With 3 plates.

——. Studies on the Etiology of Jagziekte. II. Origin of the Epithelial Proliferations, and the Subsequent Changes.—*Ibid.* pp. 335–345. With 3 plates.

HALL (Maurice C.) & CRAM (Eloise B.). Some Laboratory Methods for Parasitological Investigations.—*Jl. Agric. Res.* 1925. Apr. 15. Vol. 30. No. 8. pp. 773–776. With 1 text fig.

SCHWARTZ (Benjamin). *Ascaridia lineata*, a Parasite of Chickens in the United States.—*Jl. Agric. Res.* 1925. Apr. 15. Vol. 30. No. 8. pp. 763–772. With 18 text figs.

Note.—On direct application (not through agents or booksellers) any of the foregoing reprints or pamphlets will be sent on loan to any part of the world, the Bureau paying outward postage.

BOOKS AND REPORTS RECEIVED.

BLENKINSOP (L. J.) [K.C.B., D.S.O., Colonel-Commandant R.A.V.C.] & RAINEY (J. W.) [C.B.E.] [Edited by]. History of the Great War Based on Official Documents. Veterinary Services.—pp. x+782. With 9 plates & various charts, plans & diagrams. 1925. London: H.M. Stationery Office. [Price £1 1s. net.]

BUBBERMAN (C.). Rapport omtrent een reis naar Australië ter bestudeering van veeartsenijkundige toestanden.—176 pp. With 15 plates. 1925. Landsdrukkerij. Weltevreden. [Price f. 3.25.]

ASSAM. Report of the Civil Veterinary Department, Assam, for the Year 1924–25 [HARRIS, W., Supt., Civil Vet. Dept., Assam.]—15 pp. 1925. Shillong: Assam Govt. Press. [Price 8 annas—9d.]

BENGAL. Annual Report of the Bengal Veterinary College Including the Reports of the Epizootic Diseases of Animals Department in Calcutta and its Vicinity and the Raymond Research Laboratory for the Year 1923–24. [MACGREGOR (A. D.), Principal.]—pp. 6+iii+10+xvii+3. 1924. Calcutta: Bengal Secretariat Book Depot. [Price Re. 1.]

BOMBAY. Annual Administration Reports of the Bombay Veterinary College, Bombay City and Harbour Veterinary Department and Civil Veterinary Department in the Bombay Presidency (including Sind) for the Year 1924–25. [HEWLETT (K.), Principal.]—63 pp. 1925. Bombay: Govt. Central Press. [Price, As. 5 Ps. 6 or 7d.]

BOOKS AND REPORTS RECEIVED—*Continued.*

MAURITIUS. Annual Report on the Department of Agriculture for the Year 1924 [TEMPANY (H.), Director of Agriculture.]—24 pp. 1925. Port Louis: Printed by P. G. Bumstead, Govt. Printer.

MINISTRY OF AGRICULTURE AND FISHERIES. First Progress Report of the Foot-and-Mouth Disease Research Committee. 43 pp. With 6 figs. and 2 plans. 1925. London: Published by His Majesty's Stationery Office. [Price 1s. 3d. net.]

NEW SOUTH WALES. Department of Agriculture. Science Bulletin, No. 24. 1925. April. Veterinary Research Report, No. 1. [SEDDON (H. R.), D.V.Sc., Director of Veterinary Research.]—47 pp. 1925. Sydney: Alfred James Kent, Government Printer.

REPUBLIQUE FRANÇAISE. Rapport sur les opérations du Service Vétérinaire sanitaire de Paris et du Département de la Seine pendant l'année 1924. [MARTEL (H.).]—135 pp. 1925. Paris: Grande Imprimerie R. Hermieu. 10, 12 et 14. Avenue du Pont-de-Flandre.

UGANDA PROTECTORATE. Annual Report of the Veterinary Department for the Year ended 31st December, 1924. [POULTON (W. F.), Acting Chief Vet. Officer.]—15 pp. 1925. Entebbe: Govt. Printer.

——. Annual Report of the Department of Agriculture for the Year ended 31st December, 1924. [SIMPSON (S.), Director of Agriculture.]—54 pp. 1925. Entebbe: Govt. Printer.

WELTEVREDEN: JAARBOEK van het DEPARTEMENT VAN LANDBOUW, NIJVERHEID en HANDEL.—Hoofdstuk XII. Laboratorium voor Veeart-senijkundig onderzoek. pp. 197-220. With 2 charts. 1925.

NOTICES.

Works in the Bureau Library may be consulted between 10–0 a.m. and 5–30 p.m.

The Director will be glad to receive early copies of Authors' papers on Tropical Veterinary Diseases, and Annual and other Reports from Veterinary Departments in the Tropics, for notice in the *Tropical Veterinary Bulletin.*

TELEPHONE:—MUSEUM 3326.

The Annual Subscription for the Tropical Veterinary Bulletin, published quarterly, is TEN SHILLINGS post free.

The Tropical Diseases Bureau publishes also the TROPICAL DISEASES BULLETIN, Annual Subscription twenty-one shillings, and the BULLETIN OF HYGIENE, Annual Subscription twenty-one shillings.

Subscriptions for these publications should be sent direct to the
TROPICAL DISEASES BUREAU,
23, Endsleigh Gardens,
London, W.C.1.

All Cheques or Postal Orders should be made payable to the "Director, Tropical Diseases Bureau," and crossed "Westminster Bank Ltd."

TROPICAL VETERINARY BULLETIN.

NOTICE TO SUBSCRIBERS.

Subscribers are reminded that their subscriptions are payable in advance and become due on 1st January, 1926. They are requested to fill in and return the Bankers' Order Form overleaf or to forward the sum of Ten Shillings for the TROPICAL VETERINARY BULLETIN for 1926 with the accompanying Subscription Form to the

TROPICAL DISEASES BUREAU,
23, ENDSLEIGH GARDENS,
LONDON, W.C.1.

SUBSCRIPTION FORM.

Please send the TROPICAL VETERINARY BULLETIN for 1926 to

Name.....

Address.....

.....

for which I enclose the sum of Ten Shillings.

Date..... Signature.....

TROPICAL VETERINARY BULLETIN.

[To be filled up and returned to the
TROPICAL DISEASES BUREAU,
23, ENDSLEIGH GARDENS, LONDON, W.C.1.]

BANKERS' ORDER FORM.

To

(Name of Bank).....

(Address of Bank).....

Please pay forthwith to the WESTMINSTER BANK, LTD., Euston Road Branch, 2, Hampstead Road, London, N.W. 1, for the credit of the TROPICAL DISEASES BUREAU ACCOUNT, the sum of Ten Shillings as my Annual Subscription to the TROPICAL VETERINARY BULLETIN and pay the same amount on 1st January, 1927, and each succeeding year until further notice.

Signature .....

Address .....

.....

Date.....

[N.B.—No cheque is required if the above Bankers' Order Form is used.]

CONTENTS

DISEASES DUE TO PROTOZOAN PARASITES.

DISEASES DUE TO METAZOAN PARASITES.

BACTERIAL DISEASES.

BACTERIAL DISEASES—*Continued.*

DISEASES DUE TO FILTERABLE VIRUSES.

MYCOTIC DISEASES.

MISCELLANEOUS.